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CERTIFICATION

I have reviewed the Annual Monitoring and Evaluation Report for the Bighorn National Forest for Fiscal Year 1999. I believe that the monitoring and evaluation requirements of the Forest Plan (Chapter IV) have been met and that decisions made in the Forest Plan are still valid. I have noted and considered the recommendations and will implement those that I decide are appropriate after further analysis and required public notification and involvement.

The Bighorn National Forest is a small Forest by national standards. In a time with many national level initiatives, the effort and accomplishments reflected in this monitioring report demonstrate the public service commitment of the Bighorn National Forest Employees. I thank them , along with our many cooperators and volunteers, for delivery of tangible work that serves the American public, as it should, out on your National Forest. As the new Forest Supervisor here, I look forward to the continued leadership and professionalism that this Forest has displayed locally, across Wyoming, and in the Rocky Mountain Region.

/s/ William T. Bass **May 1, 2000**

WILLIAM T. BASS **Date**

Forest Supervisor

INTRODUCTION

The Bighorn National Forest Land and Resource Management Plan (Forest Plan) was approved in October l985. It established direction and process so that all future decisions would include an interdisciplinary approach to achieve integrated resource management. The Forest Plan provides direction to coordinate multiple-uses on the Bighorn National Forest on a sustained basis. The plan also fulfills legislative requirements and addresses local, regional, and National issues. The Forest Plan, Chapter IV requires monitoring and evaluation of management activities to determine:

1. How well Forest Plan objectives have been met.

2. Consistency of activities with standards and guidelines contained in the Forest Plan.

3. The need for amendment or revision.

This report is the annual monitoring and evaluation report. It displays the results of monitoring and provides the Forest Supervisor and public with information on the progress being made toward achieving the goals, objectives, and management requirements in the Forest Plan. It also provides information regarding how well we are fulfilling public demand for goods and services while protecting the forest resources. An annual monitoring and evaluation report is to be prepared for each existing forest plan, including those plans under revision. Funds are provided for the preparation of the report based on information and data collected under agency direction. A target of one report has been assigned to each forest.

Monitoring is the quality control aspect of forest planning. Therefore, it requires data collection and observations of activities to provide a basis for periodic evaluation of the planning process and the forest plan. Evaluation is the analysis and interpretation of monitoring results. It addresses the goals, objectives, long-term relationships, management direction, and significant management activities occurring. There are four aspects to monitoring and evaluation, they include:

Implementation Monitoring

Forest personnel conduct monitoring as part of their routine assignments and management responsibilities. Their results are documented in project files. Monitoring is performed to determine if management activities are designed and carried out in compliance with Forest Plan direction and management requirements.

Effectiveness Monitoring

Effectiveness monitoring determines if management activities are effective in driving the forest toward the desired future condition described for the various management areas.

Validation Monitoring

Validation monitoring determines whether the initial data, assumptions, and coefficients used in development of the Forest Plan were correct, or if there is a better way to meet goals and objectives and achieve the desired future condition.

Evaluation and Conclusions

The purpose of evaluation is to interpret monitoring results and reach some conclusions as to what the monitoring results really mean with regard to implementation of the Forest Plan. The interdisciplinary team (I.D. Team) may make recommendations and identify research needs as a result of the evaluation process.

PLANNING ACTIVITIES
Forest Plan Revision

The Notice of Intent (NOI) to revise the Land and Resource Management Plan for the Bighorn National Forest was published in the Federal Register on November 10, 1999. At that time the Forest Service invited comments on the information contained in the NOI, and asked that they be forwarded to us for inclusion in the revision process. The following five major revision topics were proposed in the NOI:

- Biological Diversity
- Timber Suitability and Management of Forested Lands
- Roadless Area Allocation and Management
- Special Areas
- Travel Management and Dispersed Recreation

The Completion date for our revision is scheduled for the fall of 2002.

Forest Plan Amendments

The Forest Plan has been amended fourteen times since it was approved in 1985. The amendments are summarized below and the changes in management area allocations resulting from the amendments are displayed at the end of these summaries in a table.

Forest Plan Amendment One updated the Ten-Year Timber Sale Summary (Appendix A)--Updated through 1990, Arterial and Collector Road Construction and Reconstruction Summary (Appendix B)--Updated through 1993, Trail Construction and Reconstruction Summary (Appendix C)--Updated through 1993 and Developed Recreation Site Construction/Reconstruction Summary (Appendix H)--Updated through 1993.

Forest Plan Amendment Two updated the implementation schedules, including the Ten Year Timber Sale Summary in Appendix A, Trail Construction And Reconstruction Summary in Appendix C, and Developed Recreation Site construction and Reconstruction Summary in Appendix H. It is necessary to update these schedules annually to reflect changes in planned activities due to such factors as differences between program budgets and actual appropriations, economic considerations, site-specific analysis, and other natural and physical factors.

Forest Plan Amendment Three updated Appendix A the "Ten Year Timber Sale Summary". Schedules are updated as needed to reflect changes in planned activities due to differences between in budgets, actual appropriations, economic considerations, site-specific analysis, and other natural and physical factors. The changes in the schedules did not represent a change in management direction.

Forest Plan Amendment Four changed and improved some of the monitoring requirements for wildlife, range, soils, water, riparian, and fish habitat. The Forest Interdisciplinary Team had discovered that some of the procedures and standards did not provide the best means for monitoring.

Forest Plan Amendment Five was issued to change the projected expenditures and returns shown in Forest Plan table III-1. This change updated the costs for plan implementation.

Forest Plan Amendment Six added the Forest's Recreation Strategy as Appendix J and the designation of three scenic by-ways as Appendix K. These documents did not change the overall Forest Plan direction but did clarify the goals and objectives of the recreation program.

Forest Plan Amendment Seven replaced the seven-year regeneration standard with a five-year regeneration standard, which applied to final harvest of lodgepole pine. The

amendment added additional standards and guidelines to be used in making a determination that regeneration could be assured within five years following final harvest. The amendment also made corrections to the lands designated as suited for timber harvest, reducing the amount of land suited for timber harvest by about 4,000 acres to 262,062 acres.

Forest Plan Amendment Eight changed the visual quality objectives for the Twin Lakes Reservoir special-use permit area, Sections 34 and 35, Township 54 North, Range 87 West, Sixth Principle Meridian. The visual quality objectives in management areas 04B and 09A were changed from Retention and Partial Retention to Maximum Modification. This change allowed for the expansion of the Twin Lakes Reservoir to proceed and be consistent with Forest Plan direction.

Forest Plan Amendment Nine changed management prescriptions on 83 acres of lands because of the Tie Hack Dam and Reservoir, which is located on the South Fork of Clear Creek. This amendment changes 47 acres of management prescription 4B (wildlife management) and 36 acres of management prescription 7E (timber management) to 83 acres of management prescription 9E (water impoundment).

Forest Plan Amendment Ten changed the timber suitability on a 22 acres of Management Area 1A. The timber suitability for 22 acres was changed from suited forestland - timber emphasis (511 timber component) to unsuited forestland - land not appropriate for timber production (825 timber component).

Forest Plan amendment Eleven changed the management prescriptions on 101 acres of National Forest lands located at the Twin Lakes Dam and Reservoir site located on Coney Creek, Tongue Ranger District. This amendment changes 86 acres of management prescription 9A to 101 acres of management prescription 9E.

Forest Plan Amendment Twelve changed the Standards and Guidelines in the Area of Consultation described in the Medicine Mountain Historic Preservation Plan. The current Forest Plan land allocations within the Area of Consultation will remain the same.

Forest Plan Amendment Thirteen changed 40 acres from 7E and 2B designation to 1A to accommodate the Tie Hack Campground.

Forest Plan Amendment Fourteen changed the Cloud Peak Wilderness Area from four management areas to two, and revised or added 10 standards and guidelines for management.

These fourteen amendments redistributed the management area allocations for 206 acres which is .019 percent of the total Bighorn Forest.

The Following Management Area Summary Table displays the current Management Area allocations on the Bighorn National Forest.

MANAGEMENT AREA SUMMARY TABLE

MANAGEMENT AREA	EMPHASIS	ACRES ALLOCATED IN 1985 FOREST PLAN	CURRENT ALLOCATED ACRES
1-A*	Existing & Proposed Developed Recreation Facilities	913	935
1-B	Existing & Potential Winter Sports Sites	559	559
2-A	Semi-Primitive Motorized Recreation Opportunities	42,378	42,378
2-B	Rural & Roaded Natural Recreation Opportunities	15,220	15,220
3-A	Semi-Primitive Nonmotorized Recreation Opportunities	44,660	44,660
3-B	Primitive Recreation in Unroaded Areas	45,980	45,980
4-B*	Wildlife Habitat Management for One or MoreManagement Indicator Species	206,237	206,104
4-D	Aspen Stand Management	11,171	11,171
5-A	Wildlife Winter Range in Non-forested Areas	15,500	15,500
5-B	Wildlife Winter Range in Forested Areas	10,153	10,153
6-A	Livestock Grazing, Improve Forage Condition	26,494	26,494
6-B	Livestock Grazing, Maintain Forage Condition	242,541	242,541
7-E*	Wood Fiber Production	202,500	202,442
8-A	Pristine Wilderness Opportunities	122,224	122,224
8-B	Primitive Wilderness Opportunities	45,352	45,352
8-C	Semi-primitive Wilderness Opportunities	27,493	27,493
8-D	Transition Wilderness Opportunities	424	427
9-A*	Riparian and Aquatic Ecosystem Management	11,744	11,729
9-B	Increase Water Yield	4,080	4,080
9-E*	Needed Water Impoundment Sites	0	184
10-A	Research Natural Areas	1 ,320	1,320
10-C	Scenic, Geologic, Historic, and Other Special Interest Areas	165	165
10-D	Wild and Scenic Rivers Corridors	30,559	30,559
	TOTAL FOREST ACRES	1,107,670	1,107,670

(*NOTE: Management Area 1A (Recreation Facilities) increased by 22 acres, Management Area 4B (Wildlife), decreased by 133 acres, Management Area 7E (Wood Fiber Production) decreased by 58 acres, Management Area 9A (Riparian) decreased by 15 acres, and Management Area 9E (Water Impoundment) increased by 184 acres.)

1999 MONITORING FIELD TRIP

Annual Monitoring Field Trip - The Forest conducted a review of the Caribou timber sale on August 11, 1999. The review team consisted of the Forest Leadership Team (FLT), sale administrator, hydrologist, and several district employees. The review was intended to see if the requirements in the NEPA decision were being applied to harvest units and roads within the Caribou timber sale. The focus was on Best Management Practices (BMPs). The review found that BMPs relating to general erosion control were being applied (i.e., erosion control on skid trails and roads, controlling operations to minimize erosion, etc.) whereas BMPs applied to riparian areas were not. The team found that equipment had operated within the 100' riparian area, slash piling occurred within the riparian area, and there was a lack of erosion control on a road that had been decomissioned within a riparian area. The team then discussed ways to correct the problems and how to prevent them in the future.

The Review Team had the opportunity to meet with the purchasers representative for the Caribou Timber sale on site and had a frank discussion of environmental requirements and how was the best way to assure there implementation. There was general concensus that communication between the IDT, the sale administrator, and the purchasers represenative had to occur early and often.

The BMP review identified several key problems that need to be addressed during the planning and implementation of future timber sales on the Forest.

- Site-specific BMPs need to be identified in the the planning document.
- Sale administation and engineering representatives need to be familiar with the BMPs prior to implementation.
- There needs to be additional BMP training on the Forest for the people responsible for planning and implementing projects.
- BMP monitoring needs to be incorporated into all projects which have the potential to affect water quality or soil productivity.

Monitoring Summary

Where Standards and Guidelines and BMPs were implemented they have been effective in protecting the soil and water resources. Where Standards and Guidelines and BMPs have not been implemented effects have occurred and the soil and water resourse has not been protected as effectively.

TABLE OF PROJECTED AND ACTUAL OUTPUTS

The following table displays projected average annual outputs, costs, and returns from and compares these projections with actual Fiscal Year 1999 accomplishments. A direct comparison of projected outputs is not always appropriate due to variables such as allocated budget, etc.

Table III-1

Activity	Unit of Measure	1991-2000 Avg. Annual Projected Outputs	FY 99 Outputs
SOILS			
Soil and Water Resource Improvements (i.e., improved watershed condition)	Acres	38.5	**40.0**
Annual Soil Survey	Acres	Not Estimated	**Completed**
Soil Loss (incremental increase due to timber harvest and road construction)	M tons	9.3	**~**
WATER			
Water Yield	MAF	699	**699**
Water Meeting Water Quality Goals	MAF	Not Estimated	**~**
Water Not Meeting Water Quality Goals	MAF	Not Estimated	**~**
MINERALS			
Leasing Availability Recommendations			**0**
-No Lease	M Acres	211.98	**0**
-Lease	M Acres	723.84	**0**
-Lease Without Surface	MAcres	171.85	**0**
Minerals Operating Plans	Total Number	5	**1**
FIRE			
Fire Management -Most Efficient Level	Thousand $'s	390 (609.3)	**442.0**
Fuels Breaks and Natural Fuels	Acres	300	**1,618**
WILDLIFE AND FISH			
Wildlife Habitat Improvement	Acres	2,560	**2,118**
Big Game Winter Range Carrying Capacity			
- Elk	Number	527	**527**
- Deer	Number	1,053	**1,053**
Riparian Area Improvement	Acres Improved Annually		**30**
Aspen Treatment	Acres	527	**0**
Changes in Habitat Capability of Indicator Species			**~**
- Early Successional Stage	% change (mean of 8 Species)	not estimated	**0**
- Mid Succesional State	% change (mean of 8 species)	not estimated	**0**
- Late Successional Stage	% change (mean of 6 species	not estimated	**0**
Fisheries Improvement Structures	Structures Constructed Annually	60	**10**
Activity	Unit of Measure	1991-2000 Avg. Annual Projected Outputs	FY 98 Outputs
Wildlife Structures	Structures Constructed	15	**3**

	Annually		
Threatened and/or Endangered Species Habitat Management	Number of Animals	0	**2**
RANGE			
Permitted Livestock Grazing	MAUM'S	140	**114**
Areas of Grazing, Recreation & Wildlife Conflicts Where Conflict are Reduced	Thousand Acres (Cumulative totals rather than annual outputs)	22	**111**
TIMBER			
Total Programmed Sale Volume Offered	Million BF	16.4	**3.10**
Total Programmed Sale Volume Offered	Million CF	4.2	**0.81**
Sawtimber Volume (7'+)	Million BF	14.5	**0.11**
Sawtimber Volume (7"+)	Million CF	3.8	**0.03**
Roundwood Volume Offered (live 5"- 6.5")	Million BF	0.5	**0.13**
Roundwood Volume Offered (live 5" - 6.5")	Million CF	0.08	**0.02**
Mortality Volume	Million BF	1.4	**2.86**
Mortailty Volume	Million CF	0.37	**0.76**
Timber Stand Improvement	Acres	400	**201**
Reforestation (planting and seeding	Acres	360	**290**
Clearcutting	Acres	1,194	**0**
Shelterwood Cutting	Acres	625	**0**
Uneven-aged Selection Cutting	Acres	100	**0**
Catastropice Salvage	Acres	0	**0**
INSECTS AND DISEASE			
Insect and Disease Survey	M Acres	800	**100**
DEVELOPED RECREATION			
Developed Recreation Capacity (except downhill skiing)	MRVD's	1,137	1,109
Developed Recreation Use (including visitor information services, not including downhill skiing	MRVD's	735	710
Subcategories of Developed Recreation			
Developed Recreation Capacity, public sector	MRVD's	592	614
Developed Recreation Use, public sector	MRVD's	490	444
Developed Recreation Capacity, private Sector (except downhill Skiing)	MRVD"s	545	495
Developed Recreation Use, private Sector (except downhill Skiing)	MRVD"s	245	266
DOWNHILL SKIING			
Downhill Skiing Capacity	MRVD's	25	25
Downhill Ski Use	MRVD's	18	9
Activity	Unit of Measure	1991-2000 Avg. Annual Projected Outputs	FY 98 Output
DISPERESED RECREATION			
Total Dispersed Recreation Capacity (not including wilderness	MRVD's	2,163	2597
Total Dispersed Recreation Use (not including Wilderness	MRVD's	1,063	900

Dispersed Recreation Capacity by Recreation Opportunity Spectrum Setting			~
Primitive & Semi Primitive Nonmotorized Setting (outside of wilderness)	MRVD's	215	108
Semi-Primitive Motorized Setting	MRVD's	311	264
Roaded Natural and Rural Setting	MRVD'Ss	1,648	2,225
Dispersed Recreation Use by Recreation Opportunity Spectrum Setting			
Primitive & Semi Primitive Nonmotorized Setting (outside of wilderness)	MRVD's	129	54
Semi-Primitive Motorized Setting	MRVD's	290	216
Roaded Natural and Rural Setting	MRVD'Ss	644	630
Number of Trailheads with Access for all Classes of Vehicles (incremental over pervious period	Total number (1978-1998)	Not Estimated	~
Trail Construction/reconstruction	Miles	2.9	1.5
WILDERNESS			
Wilderness Management	Acres	189,000	189,000
Wilderness Capacity	MRVD's	124	124
Wilderness Use	MRVD's	110	65
LANDS			
Land Purchase and Acquisition	Acres	Not Estimated	~
Land Exchange Offers	Acres	Not Estimated	3
Right-of-Way Acquisitions	Total Cases Each Period	0	0
Occupancy Trespass	Cases	4	1
Landline Location	Miles	38	3
FACILITIES			
Road Construction			**0**
- Arterials	Miles	1.9	0
- Local Roads	Miles	18	2.1
Road Reconstruction			**0**
- Arterials	Miles	1.9	0.1
- Local Roads	Miles	8	1.3
HUMAN AND COMMUNITY DEVELOPMENT			
Human Resource program (includes al programs except YCC and Job Corp	Enrollee years	12	8.32
Job Corp	Enrolle years	Not estimated	~
Activity	Unit of Measure	1991-2000 Avg. Annual Projected Outputs	FY 98 Output
EXPENDITURES			
Operation and Maintenance	Million Dollars	6.96	5.78
Captial Investment	Million Dollars	2.61	.105
General Admistration	Million Dollars	1.46	**0.81**
Long Range Fixed Costs	Million Dollars	0.88	**1.43**
Total Budget	Million Dollars	11.92	**5.96**
RETURNS TO TREASURY			
Returns to Treasury	Million Dollars	2.51	**0.88**

ACHIEVING OBJECTIVES OF THE FOREST PLAN

Compliance with Outputs and Effects or activities projected or scheduled in Forest Plan

A review of the Table of Projected and Actual Outputs will indicate variability in accomplishments. Outputs often vary substantially from year to year as funding levels vary. The trends in various resource areas over a three to five year period are a better reflection of whether or not the Forest Service is progressing toward accomplishment of its goals and objectives to reach the desired future condition. A more detailed discussion is contained in the narratives for individual resource areas.

The single factor that most impacts outputs and program effectiveness is the annual budget. Frequently, distribution of our funds reflects national direction and priorities of the administration and Congress. Traditionally, we have been funded at a level significantly below what was projected to implement the Forest Plan. The Fiscal Year 1999, funding level was about 50 percent of our projected need.

For the past several years we have been using a system of project budgeting often referred to as a unified budget. Employees plan this budget and execute projects on Forest wide basis and trade-offs are realized at the beginning of the fiscal year. We have made an effort to "cap" our fixed costs, (permanent employees salary, vehicles, rent and utilities, etc.,) at 70 percent of the annual budget. The remaining 30 percent of the annual budget is then to be used to provide flexibility to fund a seasonal workforce, provide training, purchase equipment, and deal with unplanned events.

There is little control at this organizational level in "out year" budget planning. Often we have frantic last minute planning when the Regional Office requests project information after monies become available at the national level.

MONITORING RESULTS

A. PHYSICAL COMPONENTS

AIR QUALITY
Program Summary

The 189,000 acre Cloud Peak Wilderness is a Class II Air Shed that is subject to protection under the Clean Air Act. It has beautiful views and outstanding scenery that could be impacted by air pollution. There are limited threats to the air quality from local sources, but global acid rain deposition may pose a larger threat.

IMPLEMENTATION MONITORING

A camera to monitor visibility was installed on Grouse Mountain early in the summer of 1995. The purpose of this camera is to monitor the long term air resource of the Cloud Peak Wilderness. Two photographs are taken daily of Mathers Peak. These photographs will be analyzed to determine whether or not there has been an increase in particulate matter.

SOIL AND WATER
Program Summary

The emphasis for the aquatics program during 1999 was to develop a watershed analysis technique that could be used on the Tongue River watershed. The technique developed was a basin survey that sampled fish, stream channel, and riparian conditions by Rosgen stream type across 110,000 acres (approximately 10% of the Forest). The information was used in the Tongue AMP (Allotment Management Plan) but will also be used as a cumulative effects tool for all activities occurring in the Tongue River watershed. This technique proved to be very effective in collecting credible data across a large landscape in a reasonable amount of time. It is likely that aquatic conditions will be collected in this manner in future AMP revisions.

There are five recurring issues related to watershed conditions on the Forest. They are: travel management, grazing, timber harvest, implementation of Best BMPs, and NEPA workloads. These issues have been raised in previous Forest Plan monitoring reports.

There were approximately 100 acres of watershed improvements completed in 1999 with an emphasis placed on improving road conditions where chronic sources of sediment have been identified. The following projects were completed in FY99:

Woodchuck Road Crossing – Installed one hardened crossing the East Fork of South Tongue. The intent of the project was to improve water quality by minimizing the amount of sediment contributed by the previous unimproved crossing.

Big Willow Road – Continued the hardening of road 159 on Big Willow Creek, a tributary to the North Tongue River.

Woodrock Crossing – Improved an existing stream crossing by hardening the approaches to provide gradient control downstream.

IMPLEMENTATION MONITORING

Caribou Timber Sale - The Forest conducted a BMP review on the Caribou timber sale in the summer of 1999. The review consisted of the Forest Leadership Team (FLT), sale administrator, hydrologist, and several Tongue district employees. The BMP review was intended to see if BMPs were being applied to harvest units and roads within the Caribou timber sale. The review found that BMPs relating to general erosion control were being applied (i.e., erosion control on skid trails and roads, controlling operations to minimize erosion, etc.) whereas BMPs applied to riparian areas were not. The team found that equipment had operated within the 100' riparian area, slash piling occurred within the riparian area, and there was a lack of erosion control on a road that had been decomissioned within a riparian area. The team then discussed ways to correct the problems and how to prevent them in the future.

The BMP review identified several key problems that need to be addressed during the planning and implementation of future timber sales on the Forest:

- Site-specific BMPs need to be identified in the the planning document.
- Sale administation and engineering representatives need to have knowledge of the BMPs prior to implementation.
- There needs to be additional BMP training on the Forest for people responsible for planning and implementing projects.
- BMP monitoring needs to be incorporated into all projects with the potential to affect water quality or soil productivity.

Effectiveness Monitoring

Where Standards and Guidelines and BMPs were implemented, they have been effective in protecting the soil and water resources. Where Standards and Guidelines and BMPs have not been implemented negative impacts have occurred.

Evaluation and Conclusions
SOILS AND WATERSHED

The mechanism currently being utilized to protect the soil and water resource is to concentrate efforts during the project planning phase. This process is effective as long as follow-up monitoring is being accomplished. More emphasis needs to be placed on implementation and effectiveness monitoring and review of project implementation as it relates to NEPA decisions. Monitoring activities that relate to implementation of project impacts, standards and guidelines need more emphasis.

PROJECTED VERSUS ACTUAL FOREST PLAN OUTPUTS

The following table displays the projected average annual outputs, costs, and returns from Forest Plan Table III-1. It compares these outputs with actual Fiscal Year 1999 accomplishments.

Table of Projected and Actual Outputs

Activity	Unit of Measure	1991-2000 Avg. Annual Projected Outputs	FY 99 Outputs MAR 13.0
SOILS			
Soil and Water Resource Improvements (i.e., improved watershed condition)	Acres	38.5	30.0
Annual Soil Survey	Acres	Not Estimated	Completed
Soil Loss (incremental increase due to timber harvest and road construction)	M tons	9.3	~
WATER			
Water Yield	MAF [1]	699	699
Water Meeting Water Quality Goals	MAF	Not Estimated	~
Water Not Meeting Water Quality Goals	MAF	Not Estimated	~

[1] MAF = Thousand Acre Feet
~ = not measured

FIRE
Program Summary

The Bighorn National Forest Fire Management Organization has completed three levels of the National Fire Management Analysis and implemented the fourth, which is monitoring and evaluation. Implementation began during the Fiscal Year 1992 budget. The first National Fire Management analysis was completed in 1989 and updated during the fall and winter of 1994. Regional certification of this analysis was completed in 1996. A reanalysis was started in 1997 and completed in January 1998, with Regional certification being given in December 1998. The reanalysis strengthened the fire and fuels management programs, increasing the coverage of days for forest engines from five to seven days. The Most Efficient Level was $1,139,000. The increase funding was due to changes in the resource coverage levels. The coverage levels were analyzed to provide coverage for seven days a week.

The classic wildland urban interface is not a complex issue since there are only 7,400 acres of alienated lands within the forest boundary. However, there are complications because there are over 300 special use summer homes, 16 special use lodges and two ski areas scattered throughout the forest. Our fire history shows that special use and private structures have been threatened or burned.

Funding for Fiscal Year 1999 was at the minus 50 percent level, which was below the lowest level of funding (minus 30%) analyzed during the 1997 analysis. Funding for Program leadership was provided for a Staff Officer, Forest Fire Management Officer, a West Side Zone Fire Management Officer, an East Side Zone Fire Management Officer, and an assistant East Side Zone Fire Management Officer. There is a need for an assistant for the West Side, but funding was not available. Dispatching for Initial Attack is provided by the Cody Dispatch Center, Cody, Wyoming. The hand and engine crews were funded for 60% of the fire season.

Fire occurrence in 1999 represented an average year. Fire restrictions kept the person-caused fires to a minimum during the dry per period in August. The Shoshone N. F managed funding for the Ft. Washakie helicopter. The Forest dispatched engines, crews, and other resources to fires in Montana and California.

There were 16 fires that burned 477 acres during Calendar Year 1999. Four of the fires were lightning caused. Twelve fires were person-caused. The 1999 fire danger was low to moderate early in the fire season. Lack of precipitation from the middle of June into the middle of July dried the heavy fuels quickly. During the last half of the July the Forest experienced two large fires. The Bull Elk Park fire was a stubborn fire to suppress. Because of the heavy fuels and the steep canyon on the Dry Fork drainage this fire was very difficult fire to control. Crews were suppressing interior spots along lines until the end of August when moderate amounts of precipitation occurred snuffing out the last of the heavy duff fires. This helped decrease the fire danger for most of September. By early October the fire danger rose again to the very high to extreme index and persisted till the middle of November when it snowed.

The Forest accomplished treatment of 2,462 acres with prescribed burning and piling for Fiscal Year 99. The burning conditions were much better this year than last year, though green-up was early and drought conditions prevented some burns from being accomplished in the late fall.

IMPLEMENTATION MONITORING

The fire organization is a team effort between the Zones. Cody Dispatch Center is responsible for initial attack dispatching. We hired 18 firefighters and a three-person fuel crew. The Wyoming Interagency Fire Crew added two new permanent part time positions at squad boss and senior firefighter. The crew was fully staffed for the 1999 summer fire season.

The Forest added the third 300-gallon Model 52 engine. There are three engines with a total carrying capacity of 900 gallons. Carrying capacity for the forest has increased to 400 gallons more water with three less engines.

Effectiveness Monitoring

Fire restrictions and a minimum of lightning kept fire occurrences low in August. Because of the very high fire danger, work was limited to projects that could be completed without compromising response time. Crews were in a constant state of readiness along with the CWN helicopter crew stationed at Burgess Junction for the Bull Elk Park Fire.

Prescribed burning projects included burning in 2,462 acres of fuels, five clear-cut units in Schuler Timber Sale, and various pile burning throughout the Forest to reduce the backlog of past hand and machine piles.

Evaluation and Conclusions

The Assistant West Side Zone Fire Management Officer was not filled due to the lack of funding. One of the Engine operator positions at Shell work center is being recruited due to resignation. The Forest is working with the Bighorn Canyon

National Recreation Area on an agreement to assist with their fire management program. The Zones have worked very well together in exchanging and sharing fire resources for initial attack and project work.

Radio communications is an on-going issue, but improvements have been made and are continuing. Radio communications are sometimes poor because of coverage and equipment limitations. Equipment was installed at the Cody dispatch center and this was the first summer that the center was able to fully dispatch units on the Forest. Adjustments have been made with cell phones, human repeaters, and local offices to provide safe and effective communications. A proposal for radio equipment replacement is in process.

Additional fuel reduction (20 acres) was completed in the Big Goose fuel reduction project area. The Granite Creek Summer Home Group fuel reduction project has been put on hold until the Antelope Butte Ski Area expansion plans have been studied.

Forest Plan direction for fire management is very general. The Standards and Guidelines provide limited direction for Fire Management while the Fire Management Action Plan has been written to provide specific fire management direction for suppression in the management areas. Preliminary data and mapping projects have continued to prepare for the upcoming forest plan revision.

The National Fire Management Analysis System (NFMAS) and the Fire Management Plan provide the necessary direction to fund an organization and implement direction to meet the Forest Plan Standards and Guidelines.

B. BIOLOGICAL COMPONENTS

WILDLIFE

Program Summary

The Bighorn National Forest supports a diversity of habitats for an estimated 300 species of wildlife. These habitats range from low elevation deciduous riparian woodlands to alpine tundra. The most common uses of the wildlife resource are viewing, photography, and big game hunting. Other uses include trapping, bird and small game hunting, and fishing.

Partnerships with organizations such as the Wyoming Game and Fish Department, Rocky Mountain Elk Foundation, Foundation of North American Wild Sheep, Trout Unlimited, The Nature Conservancy, Audubon Society and others are helping us meet Forest Plan goals for wildlife and fish habitat.

The success of seeding and rehabilitation work was monitored in the Meadows, which is along the North Tongue River directly across from Twin Buttes (southeast). All water barring, ripping, and seeding work was found to be working well, and no additional work is needed. In addition, a project to close part of FDR 156 in Bull Creek, was implemented in 1998. The roadbed was ripped and seeded. Here again, all rehab work was found to be working well and no additional work is needed. It should also be noted that the abandoned roadbed was covered with slash and debris to discourage illegal use by ATV's; this effort appeared to be effective. The Stockwell Fire also occurred in 1996, and rehabilitation work was accomplished on the Stumpy Ridge road and some seeding was done near the Little Goose Peak Mine. The mine area was not checked during 1999, and the status of rehabilitation efforts is unknown at this time.

The Skull Ridge prescribed fire of 90 acres in the spring of 1998 showed heavy cattle grazing in the burned areas during the 1998 season. An additional 86 acres were burned in the same unit during October 1998. The amount of area burned was again limited by lack of fuels, primarily grass. This project is cooperatively funded by the Rocky Mountain Elk Foundation, and trust funds from small sales collections (Knutson-Vandeberg) on the Tongue District.

The Tongue Canyon prescribed fire of 1995 was checked during an additional burn, which occurred in March of 1999. Overall, this treatment did not seem to increase the quantity of forage for big game animals and it appears, elk have not returned to this historical winter range. This portion of Tongue Canyon is historical big game winter range, but is no longer used by elk. About 809 acres had been burned previously, and an additional 171 acres were burned in 1999. The target fuels included deciduous brush and encroaching conifers, primarily ponderosa pine. The burning went very well and all objectives were met. The Rocky Mountain Elk Foundation cooperatively funds this project.

It was noted that the previous burn had been successful in killing sagebrush, but that not enough area was burned to avoid concentrating grazing animals on the new growth. On September 9, 1999, the Range Management Specialist on the Tongue District checked the unit again. It was noted at that time that cattle grazing during the 1999 season seemed to be concentrated on the areas most recently burned, but that there was little grazing in the areas burned in spring of 1998. Those areas were supporting a dense stand of grass and forbs and will likely respond similarly next year.

Some progress was made on the Dry Fork Prescribed Burning Project. The objectives for this project are to increase the quantity and quality of forage for livestock and big game animals.

All Aspen exclosures on the Tongue District and the District previously known as Buffalo, were maintained during 1999. The individual exclosures are listed below and total 51 acres.

N. Tongue - 2 exclosures, 4 acres Marcum Creek - 1 exclosure, 5 acres P.K. - 3 exclosures, 10 acres Sheeley cabin - 1 exclosure, 3 acres Hay Creek - 5 exclosures, 20 acres Dry Fork - 2 exclosures, 4 acres, Camp Creek - 1 exclosure, 1 acre, Billy Creek - 1 exclosure, 1 acre, Billy Creek II – 1 exclosure, 3 acres, #2 Aspen – 1 exclosure, 0.1 acre.

An attempt was made to treat more of the Kerns winter range with prescribed fire. However the weather inhibited our chances to conduct the burn this project is cooperatively funded by the Rocky Mountain Elk Foundation. The Kerns Prescribed burn area was not monitored this year.

Six bat houses were monitored this year. The plan was to monitor all houses at least twice each month; once during daylight hours and once after dark. Time constraints did not allow for sufficient monitoring, and most houses were only checked twice during the summer and only during daylight hours. The one at the Sheridan Work Center contained two unknown myotis. The two bats occupying this house were originally reported as Western small-footed myotis, which is a Wyoming Game and Fish sensitive species, but upon checking with bat experts from Wyoming Game and Fish the recording was changed to unknown myotis species until identification can be verified. The bat house at Big Goose Ranger Station contained one little brown myotis; this is consistent with the results from 1998. The bat house at Hunter Ranger Station contained one Townsend's big-eared bat (a Sensitive species) during 1998, but was not occupied during 1999. The other three bat houses were also not used this year.

A total of 100 Bluebird houses on the Tongue District were monitored this year using volunteers from the Sheridan chapter of the Audubon Society and John Kraft. Nesting success was above average and seemed to be related to climatic conditions. Also, the results from the 1998 nesting study were tabulated. Results were sent to all volunteers and to the National Bluebird Society. Many of the boxes have been exposed to weather for 8 to 10 years now, and most have deteriorated to the point that repairs are not feasible. We will need to look for opportunities to have new boxes built and begin to replace boxes as needed.

There are a total of 6 Owl nest platforms on the Tongue District. Monitoring was conducted this past spring to attempt to prove that we have Great Grey Owls breeding on the Bighorns. Box #5 had Great Horned Owl nesting. Boxes on Lick Creek and Sheep Creek were not checked due to poor snow conditions. All boxes were checked in June 1999. The decision was made to drop this project after six plus years has failed to document breeding of Great Grey Owls.

Modification of swallow condos at Burgess Ranger Station, the original construction may have placed the tiers too close together. The bottom two rows were the only ones being utilized by nesting swallows. This year, one tier was removed at the Burgess pond site and the middle tier was reset to allow more space between the remaining 3 tiers. The condo by the Burgess washhouse has never been used by cliff swallows. The 2nd and 4th tier were removed to allow more flight space between the remaining two tiers. This work was accomplished in late August, so results will not be known until next season (2000). We also need to make a concentrated effort to make the cabins at Burgess inhospitable and to encourage swallows to use the condo instead. There are now 3 “surplus” tiers, which could be used to build a new swallow condo somewhere else, possibly at the Burgess Visitor Information Center.

Snow track surveys for forest carnivores (pine marten, lynx, wolverine) were conducted in the proposed Sourdough Timber sale. Pine Marten and bobcat tracks were recorded, but no tracks of lynx or wolverine were found. In addition, 14 miles were surveyed in the Burgess area, no tracks were found.

Surveys for Boreal owls were conducted on the Tongue District with a taped call during the spring nesting season. Two unconfirmed sightings were reported between Burgess Visitors Center and Twin Buttes in 1998. One Boreal Owl call was recorded at 9:30 p.m. on April 7, 1999; a followup monitoring did not produce any likely calls in that area. A more extensively survey needs to take place in April 2000.

No active Goshawk nests were observed in the East Zone during the 1999-nesting season.

Work was conducted with Dr. Marion Klaus, a professor at Sheridan Community College, on her ongoing Water Vole studies. There were several meetings with Dr. Klaus and her research assistants to coordinate locations to compare ungrazed areas with grazed. Locations of established exclosures were marked on aerial photos and topographic maps for the study.

A slide presentation called, "Amphibians of the Bighorn National Forest, their Occurrence, Status, and Identification," was shown to Audubon then followed by a field trip to Shutts Flat. The presentation was also shown at the Medicine Wheel and Paintrock Ranger District, Sheridan County Fulmer Public Library, Burgess Ranger Station and for Forest Service employees. The purpose was to demonstrate the extent of our knowledge and to attempt to get more reports of sightings to broaden this knowledge.

A proposal to write a cave management plan for Cliff Dwellers cave was made again this year, but was not funded. This cave is the least impacted by humans of the four main

caves on Tongue District, but it is also one of the most important caves since it contains three species of bats one is a Region 2 sensitive, and one is a Wyoming sensitive bat. It is important that management of this cave resource is addressed in a proactive manner before irretrievable impacts occur. Forest Service Policy states that all caves should have a management plan prepared, but so far, that directive has been ignored. All four caves on the Tongue Ranger District meet the criteria to be listed as "significant" caves.

The Columbia Spotted Frog is proposed for Federal listing and an attempt was made to write a Conservation Strategy for it in Region 2 during January 1998. The Wyoming Game and Fish Department refused to participate in a Conservation Agreement, and the project was dropped. A Conservation Strategy or Agreement is a step toward preventing the listing of this species as Threatened or Endangered. Having a Conservation Strategy or Agreement in place would also provide more funding for on-the-ground habitiat improvements, which would directly benefit this species.

Surveys were conducted for amphibians in the Hazelton area of the Powder River Ranger District. Previous sightings are anecdotal, and scientific surveys were needed to validate sightings. Survey forms developed by the National Biological Service were used and results were sent to the Wildlife Observation System database which is maintained by the Wyoming Game and Fish Department and to the Wyoming Natural Diversity Database which is maintained by The Nature Conservancy. The Bighorn National Forest also maintains a record of all documented amphibian sightings. A total of 200 acres were surveyed.

Breeding success of the Columbia Spotted Frog was monitored again this year. Survival was down from previous years primarily due to freezing of the egg masses prior to hatching. Shutts Flat experienced 90+% mortality prior to hatching. Post hatch mortality of larvae was normal.

Surveys for breeding sites of Spotted Frogs were conducted in the proposed Graves Lakes Potholes project area. As a result, a new (3rd) breeding site was documented on the South Tongue River.

Graves Lake Pothole Project. The goal was to accomplish NEPA analysis, preparation of the BE, planning, application for a 404 Permit, and implementation of the Graves Lake Pothole Project this year. The objective for the project is to create potholes in Graves Lake and nearby marshes to establish additional breeding areas for the Columbia Spotted Frog The project was not funded for implementation, partial funding received for proactive field survey of heritage resources ($2,000).

Wildlife support was provided for the following environmental analyses:

- Sourdough Timber Sale
- Sibley trail rehab and suction dredging
- Woodrock Timber Sale

Sightings of TES and other significant wildlife species were recorded on the Tongue District and Powder River Ranger District and were reported to the Wyoming Observation System, which is maintained by Wyoming Game and Fish Department, and to the Wyoming Natural Diversity Database which is maintained by the University of Wyoming. These sightings are considered to be sensitive information and are not available to the general public. The recordings are mentioned here only to show that the Forest is tracking verified TES sightings.

An Archeological survey was conducted on 1 cabin site on the Tongue Ranger District. This was done in response to cabin owner requests to make improvements or additions to their permitted sites.

Cabin inspections were conducted on 3 sites on the Tongue Ranger District during Fiscal Year 1999. Inspections were done to update the files and to assure that the existing improvements were in compliance with permit stipulations in response to pending changes in ownership. Forest policy is to inspect all cabin sites bi-annually, but lack of funding forces us to only inspect those cabins which are about to be sold.

Slash piles were burned at various cabin sites on the Tongue Ranger District. Cabin owners piled the slash in an attempt to reduce fuel loadings in this type of urban interface. Fuels were reduced on a total of 3 acres.
Responded to permit transfers and requests for improvements/additions/modification when requested. Four cabin permits were transferred on the Tongue Ranger District during Fiscal Year 1999.

Inspections were conducted on three outfitter camps on the Tongue Ranger District during Fiscal Year 1999. These inspections were routine in nature and are conducted periodically to assure that camps are maintained in compliance with permit direction.

Applications were processed for seven outfitter permits on the Tongue Ranger District. Requests for renewal were due to expiration of existing permits, and no new authorizations were issued. The Forest Supervisor re-issued a decision to not issue any new outfitter authorizations pending the completion of a capacity analysis for the Forest and pending adequate funding to administer additional permits.

Fish Monitoring Contributed by the East Zone Wildlife Biologist

The exclosure fences on Lick Creek were modified to eliminate gaps at stream crossings in Fiscal Year 1998. One of the newly constructed sites had to be modified further in Fiscal Year 1999, to exclude cattle from a side gully and to reduce long-term fence maintenance due to snow damage. The Lick Creek area had fisheries structures installed several years ago and then was fenced to exclude livestock. The fence was originally built as three separate exclosures with gaps between to facilitate cattle movement across the valley. Cattle movements through the gaps were creating problems with bank stability and water quality. The grazing permittees have since indicated that the entire area could be fenced as one continuous exclosure and cattle movements would not be adversely affected. Removing the gaps benefited about 30 acres of wetland/riparian habitat and 1 mile of fisheries stream habitat. The project also reduced long-term maintenance costs.

Another goal this year was to transplant willows and reset cages within the exclosure. This work was not done again this year due to budget and time constraints.

Willows were planted in Shutts Flat in spring of 1998. Approximately 1,000 willows were planted. Areas targeted for plantings were the same sites where Wyoming Game and Fish would be installing their rock revetments later in that season. The application of willow cuttings prior to placement of rock riprap should provide short-term protection to the willows from browsing and will provide long-term protection of stream banks and visual screening of the man-made structures. Monitoring during the 1999 field season showed that the willows were alive, and appeared to be establishing well. No exceptional leader growth was noted on the new plants. Experience in similar situations has shown that the newly planted willows may take up to five years to get established and begin to put on significant leader growth.

Shutts Flat is part of an active grazing allotment. This year the permittee placed cattle in Shutts Flat for a short time to facilitate moving the animals from one allotment to another. About 350 cattle spent about 5 days in Shutts Flat. Some grazing use on the newly seeded grass was noted, but after several inspections, it was

concluded that no large-scale damage occurred. This area will need to be monitored closely in the future, and it is possible that the reseeded sites will have to be fenced to exclude cattle until a more durable stand of desirable vegetation becomes established.

All of the riparian exclosures on the east side of the Bighorns were maintained this season. These exclosures protect 1003.5 acres of riparian habitat and a total of six miles of fisheries streams.

The affected streams are**:**

Lick Creek - 3 exclosures, 30 acres, 1 mile of stream.
Fool Creek - 2 exclosures, 30 acres, 2 miles of stream.
Sucker Creek - 1 exclosure, 20 acres, 0.5 mile of stream.
Ranger Creek - 1 exclosure, 50acres, 0.5 mile of stream
East Fork - 1 exclosure, 600 acres, 1 mile of stream
Preacher Rock - 1 exclosure, 250 acres, 0.7 mile of stream
Bull Creek - 1 exclosure, 3 acres, 0.2 mile of stream.
Little Willow -1 exclosure, 15 acres, 0.1 mile of stream.
Hunter Creek Pasture - 1 exclosure, 1/4 acre.
South Hospital Hill – 1 exclosure, 1/4 acre.
Hunter Mesa Riparian - 1 exclosure, 1/4 acre.
Hunter Mesa Cow - 1 exclosure, 1/2 acre.
Hunter Mesa Wildlife - 1 exclosure, 1/2 acre.
New Hondo Creek – 1 exclosure, 1/4 acre.
Grommund Creek – 1 exclosure, 3/4 acre, 300' of stream.
Dry Poison Creek – 1 exclosure, 2.5 acres, 1000' of stream.
#3 east - 1 riparian exclosure, 16' x 16'.
#4 Hansen's spring - 1 riparian exclosure, 16' x 16'.
#1 Hansen Sawmill - 1 riparian exclosure, 16' x 16'.

Some of the above exclosures are designed to exclude big game animals, and some exclude cattle only. Monitoring has shown that annual maintenance is more cost effective than allowing the exclosures to deteriorate and then invest more work to bring them up to standard. Also, it has been shown that even one years worth of browsing inside an exclosure can set the vegetation back far enough that it takes several years of protection to recover.

The lower riparian exclosure on Fool Creek was rebuilt this year. Trout Unlimited is currently rebuilding the upper exclosure fence. Rebuilding of the lower exclosure was funded at the last minute. Using treated posts from surplus stock for cross bucks, we ordered treated poles to be delivered on site, and coordinated to have the Bighorn Hotshots build the fence in mid-August. The fence was built one-third by seasonals from the wildlife crew, one-third by the seasonal fire crew from Burgess Ranger Station, and one-third by the Wyoming Hotshots.

Willows were transplanted into empty cages inside the Fool Creek exclosure in October of 1998. The cages were moved into this exclosure during the '98 season, and came from a failed Aspen experiment on Gloom Creek. A total of 10 willows were planted.

Installed tree revetments in upper Bull Creek. This type of work was started years ago, and has proven very successful in getting vegetation established on raw banks in this stream; work needs to continue. Only about 5 trees were placed this season due to lack of time.

There is a need to maintain/supplement the willow plantings on Bull Creek at the upper exclosure. More cages could be added if funding allows, but this project is not funded this year.

MONITORING REQUIREMENT:
Management Indicator Species

Biological Evaluations and Specialist Reports were completed or are in the process of being completed for activities planned and/or executed on the westside of the Forest, including Cold Springs timber sale, Antelope Butte Ski area expansion, westside blowdown salvage timber harvest proposal, Shell Drainage Allotment Management Plan, and Hunt Mountain Prescribed Burn Plan. Management indicator species, including appropriate threatened, endangered, proposed, and sensitive species were evaluated to determine possible effects of implementing proposed activities. Mitigation measures were recommended as needed.

Old growth and snag density surveys were conducted on 1400 acres of forested habitat within the proposed Pussyfoot timber sale area. Additional field reconnaissances assessed hiding cover quality, wildlife habitat structural stages, and road densities. This data will be used to assess management activities on all wildlife species, including management indicator species. In addition, approximately 450 acres of potential goshawk habitat were surveyed to locate active nest sites; no goshawk nests were discovered.

Additional permanent hiding cover transects were established in the Cold Springs timber sale area. These transects will be used to monitor the effects of thinning on hiding cover quality. A goshawk nest discovered in the Cold Springs timber sale was monitored periodically until the two hatchlings fledged. A permanent buffer was also established around the nest site to protect the area from disturbance.

Surveys for water voles have been conducted on the Forest for several years. Permanent plots were established this year at several sites to begin monitoring the impacts of livestock grazing on water vole populations.

Shell Canyon bighorn sheep continue to be monitored to determine population trends, effects of management activities, and future management direction. Monitoring is accomplished cooperatively with the Wyoming Game and Fish Department (WGFD). Monitoring has become more difficult since all the radio collars have exceeded their life expectancy and are no longer operational.

Aspen transects and photo points were used to monitor and partition use between domestic livestock and wildlife. The following transects were set, read, and photographed twice last field season: Toe of Cement #1 and #2, East Cement, and Granite Creek. Results can be found under the Range portion of this report.

Willow transects and photo points were used to monitor and partition use between domestic livestock and wildlife. The following transects were set, read, and photographed twice last field season: Buckley Creek #1 and #2, Willow Swamp #1 and #2, Sheep Creek #1 and #2 and #3, South Tongue, Moraine Creek, Mail Creek, and Medicine Lodge Creek #1 and #2. Additional willow photo points were monitored on Crooked Creek, Trapper Creek, and Jack Creek. Results can be found under the Range section of this report.

MONITORING REQUIREMENT:
Peregrine Falcon Occupancy

No peregrine nesting activity was observed on the west side of the Bighorns.

MONITORING REQUIREMENT:
Wildlife habitat diversity

Aspen stands were monitored to determine response following prescribed burning. Stands were examined to measure regeneration and to determine if regeneration was receiving excessive browsing by ungulates. Improvements were made on one of the aspen exclosures to eliminate spots where calves were getting inside.

"Before" photographs were taken on Bear Mesa and Cookstove Basin to monitor future response of vegetation following prescribed burning conducted in 1999. All of the projects listed under the Management Indictor Species section were analyzed to determine if these areas presently meet Forest Plan Standards and Guidelines (FP S&Gs), whether they would meet these S&Gs following the proposed project, and what mitigation measures would be needed to comply with the FP. A variety of habitat components were inventoried or surveyed to determine presence/condition/classification for characteristics such as old growth, structural stages, hiding cover, snag densities, and species composition.

MONITORING REQUIREMENT:
Winter Range Carrying Capacity

Wyoming Game and Fish Department (WGFD) conducted classification surveys and trend counts on winter range. Data indicates a slight population increase over the last three years**.**

MONITORING REQUIREMENT:
Riparian Ecosystem Trends

Ongoing intensive monitoring of willow utilization by wildlife and domestic livestock was conducted on various allotments including the areas described under the Management Indicator Species section. Stubble height was also measured in conjunction with willow transects; this data can be found in the range portion of this document**.**

FISHERIES
Program Summary

The Bighorn National Forest has 1,300 miles of trout streams and approximately 5,200 acres of lakes, reservoirs, and ponds. The aquatics program on the Bighorn National Forest strives to restore, protect, and enhance aquatic resources. The diversity of water resources provides habitat for many species of fish, invertebrates, and amphibians. The broad goal of the program is to provide healthy habitat so aquatic ecosystems can function.

MONITORING REQUIREMENTS:
Fish Habitat Rating

Inventories of habitat and fish populations in selected streams were completed on the Bighorn National Forest in cooperation with the Wyoming Game and Fish Department in 1999. The data collected is the primary source of information for the evaluation of watershed conditions and to determine the trend of fish populations and stream and lake habitat.

Survey work was completed on the North and South Tongue River drainages to update records for previously established sampling stations. In 1999, 31 stations were monitored on the South Tongue watershed and 18 stations on the North Tongue. Inventory sites were located on the following streams in the South Tongue watershed; Bruce, Copper, Graves, Marcum, Mohawk, Owen, Prospect, Sheeley, main South Tongue, East Fork South Tongue, West Fork South Tongue, Sucker, and Woodchuck. Inventory sites in the North Tongue watershed were; Big Willow, Bull, Dry Gulch, Fool, main North Tongue, and Pole.

Habitat surveys were completed on the stations listed above in the North and South Tongue watersheds using the R1/R4 Fish Habitat Inventory Procedure. This protocol gives consistent and accurate measurements of important habitat variables for fast and slow water types. Inventory sites were chosen based on a sampling of Rosgen stream types identified in the Forest IRI (Integrated Resouce Inventory) stream database. Replicate samples were collected within each stream type as were samples taken in reaches considered to be in good and bad condition.

Trout populations were also sampled in the North and South Tongue watersheds. Many of these samples were taken in reaches with a habitat inventory. Inventories were

conducted using an electofisher. As was the case with past surveys of the Tongue drainage, trout population estimates varied widely between streams and are numerically dominated by brook trout. Growth parameters show a preponderance of small fish in these streams which is consistent with all surveys. Logically, cold temperatures, short growing seasons, shallow streams, high densities, and the relatively low productivity of the granitic watersheds are all factors that could limit the maximum size fish attain in these streams. The average condition factors for trout in these drainages is quite high, and there is no obvious indication that food is in short supply.

YELLOWSTONE CUTTHROAT TROUT RESEARCH on the Bighorn National Forest

The Yellowstone cutthroat trout (YSC) is a sub-species of cutthroat trout native to Wyoming. Yellowstone cutthroat trout currently only occupy about 10% of their historic stream habitat outside of Yellowstone National Park. To determine the extent, purity, and important habitat variables for YSC in the Bighorn National Forest, the Wyoming Game and Fish Department is working cooperatively with the Forest to assess conditions for the YSC.

In 1999, the Bighorn National Forest obligated $30,000 of regional TES funds, $15,000 of inland cutthroat money, and $3,000 from the the local chapter of Trout Unlimited to investigate YSC on the Bighorn National Forest. Other cooperators are the University of Wyoming and the Wyoming Game and Fish Department.

MONITORING REQUIREMENT:
Riparian Ecosytem Trends

Lick Creek - The Lick Creek exclosure fences were changed to eliminate gaps at stream crossings. The Lick Creek area had fisheries structures installed several years ago and then was fenced to exclude livestock. The fence was originally bult as three separate exclosures with gaps between to facilitate cattle movement across the valley. Cattle movements through the gaps were creating problems with bank stability and water quality. Removing the gaps benefited about 30 acres of wetland/riparian area and 1 mile of fisheries habitat.

Shutts Flat - Willows were planted in Shutts Flat (South Tongue watershed) in 1998. Monitoring during 1999 showed that the willows were alive, and appeared to be well established.

Riparian Exclosures - All riparian exclosures on the east side of the Bighorns were maintained in FY99. These exclosures protect a total of 1003 acres of riparian and approximately 6 miles of stream. The following table gives the specific exclosures monitored.

Fool Creek – The lower riparian exclosure on Fool Creek was rebuilt in 1999. Trout Unlimited is currently rebuilding the upper exclosure. Willows were transplanted into empty cages inside the Fool Creek exclosure in FY99.

Bull Creek – Installed tree revetments in upper Bull Creek. This type of work was started a few years ago and has been successful in getting vegetation established on raw banks of the stream.

All riparian exclosures on the east side of the Bighorns were maintained in FY99. These exclosures protect a total of 1003 acres of riparian and approximately 6 miles of stream. The following table gives the specific exclosures monitored.

Exclosure	Number of Exclosures	Acres Protected	Miles of Stream Protected
Lick Creek	3	30	1
Fool Creek	2	30	2
Sucker Creek	1	20	.5
Ranger Creek	1	50	.5
East Fork	1	600	1
Preacher Rock	1	250	.7
Bull Creek	1	3	.2
Little Willow	1	15	.1
Hunter Creek	1	.25	
South Hospital Hill	1	.25	
Hunter Mesa	1	.25	
Hunter Mesa	1	.5	
Hunter Mesa	1	.5	
New Hondo Creek	1	.25	
Grommund Creek	1	.75	300 feet
Dry Poison Creek	1	2.5	1000 feet
#3 East	1	16x16 feet	
#4 Hansens Spring	1	16x16 feet	
#1 Hansen Sawmill	1	16x16 feet	

Rare Plant Program

Program Summary

A two person inventory crew inventoried at least 17,000 acres. Inventory areas were selected by reviewing known element occurences for habitat, soils, elevations, aspects, etc. A GIS predictive modeling technique was utilized for the Tongue AMP plant survey. New plant locations were confirmed by specimen collection which was authenticated by Wyoming Natural Diversity Database (WYNDD) personnel.

Arnica lonchophylla and Penstemon caryii were the two sensitive species prioritized for search. A high number of new occurences were discovered, relative to the number of occurences previously known. A large percentage of the inventory time was spent unsuccessfully looking for these plants, so we learned about their "rarity", especially when compared to A. lackshewitzii and A. mollis, which are relatively common.

Walt Fertig (WYNDD) developed a monitoring protocol for R. acaulis. The objective of this monitoring is to detect whether or not the population is increasing, decreasing or remaining stable. Considering the Rubus inventories done when the plant was "discovered" in 1996, and additional surveys this summer, it is very likely that this is the only occurrence of this species on the Bighorn.

Some Wyoming Natural Diversity Database Species of Concern were searched for this summer. Included were Cymopterous williamsii, a Bighorn endemic; Physaria lanata, and Cypripedium montanum. Putting these plants on our "radar screen" will give us data to help determine whether or not these species are indeed "sensitive" should they be nominated, and will help us determine if any projects we have could be negatively affecting these plants.

Sensitive Species	New Occurences in FY 1999	Expanded Occurences in 1999	Previously Known Occurences
Agoseris lackshewitzii	7	0	19
Aster mollis	4	0	29
Arnica lonchophylla	2	0	6
Festuca hallii	0	0	1(?)
Penstemon caryii	3	1	7
Rubus acaulis	0	0	1
Sullivantia hapemanii	1	0	13

The photo on the left shows Pink Agoseris, Agoseris lachshewitzii (pink flower on right) and Pale Agoseris, Agoseris glauca (orange flower on left and top). The photo on the right shows typical pink agoseris habitat. Pink agoseris was first described in the scientific literature in 1990, and since little was known at that time about its abundance or habitat, it was added to the list of "sensitive" species. Monitoring and surveys over the past decade have revealed that this plant and its habitat are actually relatively common, which has led WYNDD botantists to consider lowering the sensitivity level of this plant. Monitoring can show which plants are indeed rare, so that management strategies can be developed for species that actually do need protection.

Range

Program Summary

The past year was a busy year for the range personnel on the Forest with several significant accomplishments realized over the year. Dave Morris, Rangeland Management Specialist for the Medicine Wheel/Paintrock District received the Rocky Mountain Regions Regional Forester award for "On The Ground Excellence". This award recognized Dave's efforts over the years in resource management and especially the management he was able to achieve on the Paintrock C&H Allotment.The Forest Service has 76 active grazing allotments and 9 vacant allotments. There are 112 permittees permitted to graze 27,637 cattle, 22,887 sheep, and 260 horses.

The Medicine Wheel/Paintrock District (MWPN) completed the NEPA analysis on 58,000 acres covering 5 grazing allotments. The Allotment Management Plans will be completed this year.

The Powder River District (PRRD) completed the NEPA analysis on 111,420 acres in 1998 and developed Allotment Management Plans for the 9 allotments and 1 stock drive this year.

The Tongue District initiated the NEPA analysis on the Tongue Drainage this year with projected completion of the Decision Notice, September 30, 2000. The inventory to support the analysis covered 172,119 acres.

All three units inventoried 33% of their range improvement during the 1999 field season with the remaining 66% to be inventoried during the 2000 field season. This added a substantial workload to the Range Specialist during our short field season when the improvements are accessable. Folders are being constructed to maintain the data collected and will need to be kept current as new improvements are constructed.

The coordination with the prescribed fire program was a success with several projects being completed. The Red Reservoir and Zaybrook units on the Powder River District and Runaway Ramp, Cook Stove Basin, South Rim and Kershner Spring units on the Medicine Wheel/Paintrock District were treated with fire. The program treated decadent sagebrush stands, improving species diversity, improving wildlife habitat and reducing fuel loadings.

In 1999 the Forest utilized Management Agreements with Bighorn, Johnson, Sheridan and Washakie County Weed & Pest Districts to control noxious weeds on the Forest. The four Weed & Pest Districts covered 4588.7 gross acres to treat 721 net acres of noxious weeds, maintained treatment records and inventoried all locations treated. Due to the continuing success of this program it will be continued in the forseeable future.

Stubble Height Guidelines for key management species on Allotments with riparian and wetland areas*		
ALLOTMENT STATUS	GRAZED BEFORE AUGUST 1 ANNUALLY	GRAZED ON OR AFTER AUGUST 1 ANNUALLY
U-1 ANDU-2	Average Four inch stubble height	Average six inch stubble height
S-1, S-2 and U3 Allotments	Average Four inch stubble height	Average Four inch stubble height

Livestock will be removed from the pasture when proper stubble height is achieved. The Forest Service completed NEPA analysis for nine Allotments and one Stock Driveway during 1998 on the Powder River Ranger District. The following Allotments were analyzed and the Allotment Management Plans will be completed in 1999:

1. Clear Creek C&H Allotment
2. Crazy Woman S&G Allotment
3. Doyle Creek C&H Allotment
4. Grommund Creek C&H Allotment
5. Muddy Creek C&H Allotment
6. Poison Creek C&H Allotment
7. Powder River C&H Allotment
8. Sourdough C&H Allotment
9. Upper Doyle S&G Allotment
10. Crazy Woman Stock Drive

Permit action was taken against one Term Grazing Permit for failure to maintain improvement and litigation is continuing on the Forests denial of a request for a grazing permit.

Stubble Height Monitoring Results 1999

I. *Number of Allotments*:	**MW/ PN**	**PR RD**	**TONGUE**	**Entire Forest**
Total Number of Active Allotments w/Term Permits	28	22	28	78
Allotments Monitored by Permittees	16	10	16	42
Allotments unknown-Data not received yet	10	7	12	29
Allotments Monitored by F.S. (Transects run)	23	10	17	50
% of Allotments Monitored by Permittees	57	46	57	53
% of Allotments Monitored by U.S.F.S	82	46	61	63
Total Percent of Allotments Monitored[1]	82	59	79	73
Does not mean 100% of Allotment Acreage				
Allotments Exceeding Standards to the Point of Discussing/Implementing Resource Recovery Period	0	2	4	6
II. *Number of Permittees*				
Total # of Permittees (Permittees only counted once)	35	40	36	111
Number of Permittees Providing Transect ***	21	10	23	54
Permittees with data, but not turned in yet	5			5
Permittees not known if collected data	2	10	13	25
% of Permittees Providing Transects	60	25	64	5063
III. *Number of Forage Utilization Transects*[2]				
Transects Read by Permittees	35	51	46	132
Number that met Standards	28	46	45	119
% that met Standards	80	90	98	89
Transects Read/Spotchecked by USFS	24	29	34	87
Number that met Standards	13	25	25	63
% that met Standards	54	86	74	71
Transects Read by FS/Permittee Together	4	7	1	12
Number that met standards	2	5	0	7
Total % of Transects Meeting Standards	50	71	0	40
Total Number of Transects Read	63	87	81	236
Total No. of Transects Meeting Standards	43	76	80	199
Total % of Transects Meeting Standards	68	87	99	84
IV. *Number of Willow Utilization Transects*[3]				

[1] Not all monitoring information has been turned in to date by permittees, so there will be additional numbers of photopoints and transects read for the 1999 monitoring that are not reflected above.

[2] See Above

[3] On-going intensive monitoring of willow utilization by wildlife and domestic livestock was conducted on various allotments. No more than 30% of leaders are to be browsed by both wildlife and livestock in order to meet utilization standards. Stubble height was also measured in order to meet utilization standards. This data can be found in the range portion of this document.

Transects Read by Permittees	4	0	5	9
Transects Read/Spotchecked by USFS	18	0	16	34
Total Number of Transects Read	22[4]	0	21[5]	43
V. *Number of Aspen Utilization Transects*				
Transects Read by Permittees	3	0	0	3
Number that met Standards	3	0	0	3
Transects Read/Spotchecked by USFS	6	0	0	6
Number that met Standards	0	0	0	0
Total Number of Transects Read	9	0	0	9
Total No. of 'Transects Meeting Standards	3	0	0	3
VI. *Number of Bank Stability Readings*				
Reading Taken by Permittees	0	0	0	0
Number that met Standards				
Readings Taken by USFS	0	0	0	0
Number that met Standards				
Total Number of Readings Taken	0	0	0	0
Total Number of Readings Meeting Standards				
VII. *Photopoints*				
Recorded by Permittees	2	3	28	31
Recorded by Forest Service[6]	0	9	62	71
Recorded by Permittee/FS together	7	0	0	0
Total Photopoints Recorded	9	12	83	95

[4] Seven of the willow transects are read to obtain percent of twigs removed. Five of those transects are on an allotment where utilization of 30% is standard. Four of those transects did not meet standards. Two of the transects were established to determine the amount of use and by which browser. The remaining 14 transects measure height and were established to detect a positive or negetive change in height. Eleven Aspen transects were read of which eight of these transects are located on an Allotment which has an Aspen utilization standard of 10% on terminal buds. Only one of these transects recorded use levels below. The remaining transects were established to monitor change in height and number of sprouts.

[5] Includes pre and post grazing transects using marked twig method, height density transects and ocular spot checks.

[6] Majority of the photopoints are tied to aspen, willow and streambank transects.

[7] Based on 1998 data, the 1999 data has not been compiled due to computer program changes.

[8] Sheep Creek Transect #2 is inside an exclosure. Measurement was made for the period cattle were in the pasture. 1999 data has cattle use in the exclosure as cattle accessed the area prior to the exclosure being put up.

MANAGEMENT ATTAINMENT SUMMARY

Description	Target	Accomplishment
Allotments Analyzed	5 Allotments	5 Allotments
Grazing Allot. Admin. to Std.	64 Allotments	64 Allotments
Grazing Allot. Admin. Total	95 Allotments	78 Allotments
Cattle & Horses (Billed)[7]	84,000 H.M.'s	87,000 H.M.'s
Sheep & Goats (Billed)	36,000 H.M.'s	52,000 H.M.'s
Rangeland Monitored & Evaluated.	58,000 Acres	58,000 Acres
Rangeland Resource Inventory	140,000 Acres	172,000 Acres

POWDER RIVER RANGER DISTRICT

MONITORING REQUIREMENT:
Range Vegetation Management

planned	accomplished 09/30/99
Noxious weed agreement with Johnson County	completed 5.25 treated acres, 975 gross acres
Noxious weed agreement with Washakie County	completed 277 treated acres, 2496 gross acres
TOTAL ----------	3471 gross acres

MONITORING REQUIREMENT:
Forage Utilization of Allotments

ALLOTMENT	PASTURE	MONITOR BY	LOCATION	STANDARD	MEASURE MENT
Baby Wagon S & G	Vacant				
Battle Park C & H	Soilder Creek	FS	Just off road by utilization cage	5	6.3
	S. Fork South	FS	Along creek looked good; no measurement taken		OK
	Warner Ridge	FS	Middle of Warner Draw	5	3.5
	Bald Ridge	FS	Warner Spring Riparian area	5	2.96
Clear Creek C & H	Circle Park	Permittee	Key are Poa-Carex	5	4.46
	North Hospital Hill	Permittee		5	8.8
	Upper Buffalo	Permittee	Key are Poa-Carex	5	6.6
	Hondo	Permittee	Carex	5	7.36

ALLOTMENT	PASTURE	MONITOR BY	LOCATION	STANDARD	MEASURE MENT
	Lower Buffalo	Permittee		5	6.42
	S. Hospital Hill	Permittee		5	9.36
	Grouse Mt.	FS & permittee	Key Area	5	Ocular, ok
	S. Lucast	FS & permittee	Key Area	5	Ocular, 7-8 inches
	Hunter Mesa	FS & permittee	Key Area	5	6.18
Clear Creek C & H	Hunter Corrals	FS & permittee	Key area just south of corrals	5	Ocular,
	Circle Park	FS	Key Area	5	6.7
	Circle Park	FS	Key Area	5	5.9
	Circle Park	FS	North of campground	5	5.6
	Schoolhouse	Permittee	Key Area	5	6.5
	Hunter Creek	Permittee	No Measurable use	5	Ok
	N. Luscasta	Permittee	Key area on Bluegrass-Fescue	5	4.32
	N. Lucasta	Permittee	Key area on carex	5	9.06
Cloud Peak S & G	Vacant				
Crazy Woman Stock Drive	No monitoring				
Crazy Woman S & G	(see Muddy C & H)				
Doyle Creek C & H	West Doyle	Permittee	H-1	5	6.84
	Lower Doyle	Permittee	H-1	5	11.48
	Lower Doyle	FS	Below campground; on **GREENLINE**	5	8.72
	Lower Doyle	FS	Below campground – photopoint established		
	Lower Doyle	FS	Below campground – two line intercept transects established		
Dry Tensleep	No monitoring				
Elk Lake S & G	Vacant				
Garnet Creek S & G	No monitoring				
Grommond C & H	West Sourdough	Permittee	Hanson's Sawmill	5	6.02

ALLOTMENT	PASTURE	MONITOR BY	LOCATION	STANDARD	MEASUREMENT
	West Sourdough	Permittee	Hanson's Sawmill – Streambank photos retaken		
Grommond C & H	West Sourdough	Permittee	Lynx Park	5	6.22
	West Sourdough	FS	Hanson's Sawmill	5	5.30
	West Sourdough	FS	Below Tie Hack Dam in old beaver pond – two photopoints established		
	East Sourdough	Permittee	East of Highway	5	8.54
	West Sourdough	FS	Near 16 x 16 exclosure	7	13.07
	West Sourdough	FS	Key area near highway	7	13.07
	West of Camp	Permittee	Key area	5	5.32
	West of camp	FS	Key area	5	4.58
	Brush Creek	FS	Key area	5	Ocular; OK
	Upper Grommund	FS	Key area	5	Ocular; OK
	South East	Permittee	Key area	5	8.14
	South East	Permittee	Key area – streambank photos retaken		
	Lower	Permittee	Key area	5	9.26
	Lower	Permittee	Key area – streambank photos retaken		
Hazelton S & G	No monitoring				
Leigh Creek S & G	Vacant				
Little Piney C & H		FS & Permittee	Outhouse park	5	4.68
		FS & Permittee	Hepp Park	5	Ocular; OK
McLain S & G	Vacant				
Misty Moon S & G	(see Battle Park)				
Monument C & H	Trail	Permittee	Photos only		
Muddy Creek C & H	Holding	Permittee		5	10.48
	Lower Elgin	Permittee	Key area	5	5.77
	Upper Elgin	Permittee	Key area	5	8.47

ALLOTMENT	PASTURE	MONITOR BY	LOCATION	STANDARD	MEASUREMENT
	Lower Elgin	FS & Permittee	Key area	5	4.1
	Upper Elgin	FS	Grommund Exclosure – photopoint re-taken		
	Upper Elgin	FS	Grommund creek – line intercept, WC-1, T-1, T-2, & T-3		
	Upper Elgin	FS	Grommund exclosure – line intercept, WC-2, T-1 & T-2		
	Caribou	Permittee	Campground on CW Creek	5	10.5
	Caribou	Permittee	Caribou Creek on Pole Creek Road	5	7.18
	Upper Elgin	FS	Little Sordough Drainage – Line intecept WC-3, T-1 and t-2 established		
	Caribou Creek	FS	Key area	5	NA
	Upper Elgin	FS	Little Sourdough near holding pen	5	Ocular, OK
	Upper Elgin	FS	Little Sourdough near old cabin west Elgin trailhead	5	7.42
	Upper Elgin	FS	Grommund Creek near exclosure	5	Ocular, OK
	Crazy Woman	FS	Along stream **GREENLINE**	5	10.1
	Crazy Woman	FS	Along stream – established photopoint		
	Crazy Woman	Permittee	Hess Creek on Pole Creek Road	5	7.61
	Crazy Woman	Permittee	Crazy Woman Creek on Pole Creek Road	5	7.82
	Crazy Woman	FS	Merle Creek	5	Ocular, OK
	Pole Creek	Permittee		5	0
North Canyon C & H	No monitoring				
Piney C & H		Permittee	Big Swamp H-1	5	12.8
		Permittee	Big Swamp H-2	5	8.22
		Permittee	Ranger station H-1	5	8.5
		Permittee	South Swamp H-1	5	13.5
Poison Creek C & H	Billy Creek	Permittee		5	
	Poison Creek	Permittee	Poison Creek	5	11.64
	Billy Creek	Permittee	H-1	5	9.24
	Billy Creek	Permittee	H-2	5	8.98
	Billy Creek	FS	South east riparian	5	Ocular; OK

ALLOTMENT	PASTURE	MONITOR BY	LOCATION	STANDARD	MEASURE MENT
	Billy Creek	FS	Billy Creek Spring	5	Ocular; OK
	Poison Creek	FS	North end; riparian	5	5.81
	Poison Creek	FS	East of road	5	Ocular; OK
	Poison Creek	FS	East, near old dam	5	Ocular; OK
Powder River C & H	Powder River	FS	Above exclosure	7	5.6
	Powder River	FS	Above exclosure	7	3.9
	Powder River	FS	Near Forest Boundary	7	4.15
	Powder River	FS	New Powder River – re-take photopoints 4,6,8,9		
	Powder River	FS	Mid way between exclosure & Forest boundary – establish Willow cluster-1, transect-1		
	Powder River	FS	Mid way between exclosure & Forest boundary – establish Willow cluster-2, transect-1		
	Powder River	FS	mid way between exclosure & Forest boundary – establish photopoint at WC-1, T-1		
	Powder River	FS	Mid way between exclosure & Forest boundary – establish Point bar photo site 2		
	Powder River	FS	Near Forest boundary – establish Point bar photo site 1		
Rock Creek C & H	N. French Creek	Permittee	Tributary to Johnson Creek	5	9.76
	N. French Creek	Permittee	Johnson Creek	5	7.42
	N. French Creek	Permittee	N. of cow camp; between camp & Johnson Creek	5	5.92
	Johnson Creek	Permittee	North of Paradise	5	4.45
	Johnson Creek	Permittee	Pack trail by meadow	5	4.36
	Rock Creek	Permittee	Ginger's Cabin	5	9.56

ALLOTMENT	PASTURE	MONITOR BY	LOCATION	STANDARD	MEASUREMENT
	Rock Creek	Permittee	Sayles Creek	5	5.8
	S. French	Permittee	North of Cabin	5	13.26
	S. French	Permittee	Cull Watt Park	5	10.72
Sourdough C & H	(see Grommund C & H)				
South Canyon C & H	Child Creek	Permittee	Greenline	4	10.5
	Child Creek	Permittee	10-25' from stream	4	6.8
	Canyon Creek	Permittee	Site 3	4	7.72
	Leigh/Creek	Permittee	Below exclosure on freenline	4	9.7
	Leigh/Creek	Permittee	Below exclosure 15' from stream	4	7.9
	Canyon Creek	Permittee	Site 1 along creek open meadow	4	10.34
	Canyon Creek	Permittee	Site 1 10-20' from stream	4	8.3
	Canyon Creek	Permittee	Site 2 greenline	4	7.9
	Canyon Creek	Permittee	Site 2 10-20' from stream	4	7.4
Tensleep Canyon C & H	Main	FS	Just below Willow Springs	5	4.22
	Main	FS	Near Forest Boundary – establish permanent photopoint		
	Main	FS	Key area near cage	5	4.0
	Main	FS	Key area near cage – establish 2 permanent line intercept transects		
Upper Doyle S & G	(see Doyle C & H)				
Upper Meadows S & G	No monitoring				
Willow Park C & H	No monitoring				
Willow S & G	No monitoring				

MEDICINE WHEEL AND PAINTROCK RANGER DISTRICT

MONITORING REQUIREMENT:
Range Condition and Trend

No condition or trend data was collected during the 1999 field season. Cumulative effects study of browsing on willow by both wildlife and livestock conducted by a graduate student from the University of Wyoming began on the Paintrock District in 1995 and may have been completed in 1998. No reports on the study have been received since 1997.

MONITORING REQUIREMENTS:
Forage Utilization (Upland Range Sites)

ALLOTMENT	PASTURE	VEGATATION TYPE	METHOD USED	UTILIZATION
Granite Creek	Middle	FEID - ARTR	Ocular/Height Weight	40-60%+
Granite Creek	Upper	FEID-ARTR	Ocular	20-60%
Salt Creek	East Willett	FEID-DAIN	Ocular	20-50%
Salt Creek	Big Spring	FEID-ARTR	Ocular	40-60%
Salt Creek	Ski Area	SLX-DECA	Ocular	40-50%
Salt Creek	Salt Creek	FEID-ARTR	Ocular	40-50%
Salt Creek	Upper Cabin	FEID-ARTR	Ocular	30-60%
Salt Creek	Lower Cabin	FEID-ARTR	Ocular	40-50%
Salt Creek	Lower Beef	FEID-ARTR	Ocular	40-50%
Shell Creek	Lower Shell	FEID-ARTR	Ocular	55-65%
Shell Creek	Antelope Butte	FEID-ARTR	Ocular	45-55%
Crooked Creeks	Crooked Creek	FEID-ARTR	Ocular	35-40%
Traper Creek	Mill Creek	FEID-ARTR	Ocular	60%+
Trapper Creek	Black Butte	FEID-ARTR	Ocular	45-55%
Medicine Lodge	Lower	FEID-DAIN	Ocular	30%
Medicine Lodge	North High	FEID-Carex	Ocular	50%
Medicine Lodge	Lakes of the Rough	DES-CAR	Ocular	20-60%
Forks	Lower Cold Spring	FEID-ARTR	Ocular	45-55%
Forks	Upper Cold Spring	FEID-ARTR	Ocular	45-55%
Forks	Lower Cold Spring	Aspen	Ocular	60%+
Forks	Anthony Park	FIED-DAIN	Ocular	40%
Paintrock Basin	North High	FIED -DAIN	Ocular	20%
Paintrock Basin	Willow Swamp	Aspen-POA	Ocular	55%
Paintrock Basin	East Cement	FEID-ARTR	Ocular	40-50%
Paintrock Basin	Toe Of Cement	FEID-ARTR	Ocular	40-55%

ALLOTMENT	PASTURE	VEGATATION TYPE	METHOD USED	UTILIZATION
Paintrock Basin	West Bench	POA-BRO	Ocular	40-60%
Paintrock Basin	Lower West Side	FEID-ARTR	Ocular	45-50%
Paintrock Basin	Jakes Garden	FEID-ARTR	Ocular	50-55%
Paintrock Basin	Lower Woodchuck	POA-ARTR	Ocular	60%+
Paintrock Basin	Upper Woodchuck	FEID-ARTR	Ocular	45-55%
Paintrock Basin	Battle Park	FEID-DAIN	Ocular	40-45%
Paintrock Basin	Long Park Creek	Aspen -Poa	Ocular	30-60%
Shell Basin	Buckley Creek	Carex-SLX	Ocular	50-65%
Sunlight Mesa	Cottonwood	Artr-Feid	Ocular	30%
Sunlight Mesa	Torry Gulch	Feid-Dain-Artr	Height/Wt./ Photo	7.16”
Sunlight Mesa	Torry Gulch	Feid-Dain-Artr	Height/Wt./ Photo	7.64”
Sunlight Mesa	Deer Springs	Feid	Height/Weight	35% w/ livestock in pasture
Wiley Sundown	Wiley Sundown	Dain-Feid	Stubble Height	2.96” w/2-3” standard
Wiley Sundown	Wiley Sundown	Dain-Feid	Stubble Height	2.7” w/2-3” standard
Finger Creek	Finger Creek	Artr-Feid	Ocular	30-50%
Wallrock-Hidden Tepee	East Tepee	Feid-Dain	Ocular	20-40%
Wallrock-Hidden Tepee	West Tepee	Feid-Dain	Ocular	20-40%
Wallrock-Hidden Tepee	West Fork	Artr-Feid	Ocular	20-50%
Pole Creek	Ice Creek	Dain-Feid	Ocular	30%
Pole Creek	Middle	Dain-Feid	Ocular	30-60%
Pole Creek	Tongue	Dain-Feid	Ocular	30-60%
Pole Creek	Hunt Mt.	Dain-Feid	Ocular	20-50%
Little Horn S&G	East	Artr-Feid	Ocular	20-55%
Medicine Mt.	Lower Porcupine	Artr-Fedi	Ocular	20-50%
Little Horn C&H	Trail	Artr-Feid	Ocular	20-60%
Little Horn C&H	Willow	Artr-Feid	Ocular	25-60%
Little Horn C&H	Wagon Box	Artr-Feid	Ocular	30-50%
Devil’s Canyon	Cookstove	Artr-Feid	Ocular	20-35%

MONITORING REQUIREMENT:
Forage Utilization (Riparian and Aspen Range Sites)

Stubble height in Riparian and Aspen stands. Browse transects in Aspen and Willow communities to monitor amount of current years growth removed by wildlife and livestock and by wildlife alone.

Allotment	**Pasture**	**WL/ Cattle**	**Veg Type**	**Method Used**	**Standard**	**% Use or Residual Ht. Left**
Granite	Middle	Cattle	Carex	Stubble Height	7 inch	4 - 7
Shell Cr.	Antelope Basin	Cattle	Carex	Ocular	5 inches	6+
Shell Cr.	Upper Shell	Cattle	Carex	Ocular	5 inches	5+
Shell Basin	Buckley Cr.	Cattle	Carex	Ocular	7 inches	3 - 6+
Shell Basin	Buckley Cr.	Cattle/WL	Willow	Marked twig	30%	83%
Shell Basin	Buckley Cr.	Wildlife	Willow	Marked twig	30%	50%
Crooked Cr	Johnny Cr.	Cattle	Carex	Stubble Height	7 inches	4
Crooked Cr	Jack Cr.	Cattle	Carex	Stubble Height	7 inches	4 - 6
Crooked Cr	Crooked Cr.	Cattle	Carex	Stubble Height	7 inches	5.5
Salt Cr.	Big Spring	Cattle	Carex	Stubble Height	7 inches	4
Paintrock	T of Cement #1	Cattle/WL	Aspen	Marked twig	10%	88%
Paintrock	T of Cement #1	Wildlife	Aspen	Marked twig	10%	97%
Paintrock	T of Cement #2	Cattle/WL	Aspen	Marked twig	10%	87%
Allotment	Pasture	WL/ Cattle	Veg Type	Method Used	Standard	% Use or Residual Ht. Left
Paintrock	T of Cement #2	Wildlife	Aspen	Marked twig	10%	100%
Paintrock	East Cement	Cattle/WL	Aspen	Marked twig	10%	60%
Paintrock	East Cement	Wildlife	Aspen	Marked twig	10%	76%
Paintrock	W. Swamp #1	Cattle/WL	Willow	Marked twig	10%	35%
Paintrock	W. Swamp #1	Wildlife	Willow	Marked twig	10%	73%
Paintrock	W. Swamp #2	Cattle/WL	Willow	Marked twig	10%	23%

Allotment	Pasture	WL/ Cattle	Veg Type	Method Used	Standard	% Use or Residual Ht. Left
Paintrock	W. Swamp #2	Wildlife	Willow	Marked twig	10%	75%
Paintrock	Sheep Cr. #1	Wildlife	Willow	Marked twig	10%	55%
Paintrock	Sheep Cr. #1	Cattle/WL	Willow	Marked twig	10%	49%
Paintrock	Sheep Cr. #2[8]	Wildlife	Willow	Marked twig	10%	30%
Paintrock	Sheep Cr. #2	Cattle/WL	Willow	Marked twig	10%	4%
Paintrock	Sheep Cr. #3	Wildlife	Willow	Marked twig	10%	47%
Paintrock	Sheep Cr. #3	Cattle/WL	Willow	Marked twig	10%	22%
Medicine L.	Medicine Lodge	Cattle/WL	Carex	Ocular	7 inches	8+
Medicine L.	Medicine Lodge	Cattle/WL	Willow	Height/Photo	Trend	Static
Trapper Cr	Mill Creek	Cattle	Carex	Ocular	7 inches	<7
Forks	Med. Lod.	Cattle	Aspen	Ocular	4 inches	<4
Forks	Meadow Cr.	Cattle	Carex	Ocular	7 inches	8+
Forks	Anthony Park	Cattle	Carex	Ocular	5 inches	8+
Sunlight Mesa	Deer Springs	Cattle	Under Aspen	Stubble Height	4”	8”
Medicine Mountain	Lower Porcupine	Cattle	Carex	Stubble Height	7”	8.25”
Medicine Mountain	Lower Porcupine	Cattle	Carex	Stubble Height	7”	8.41”
Medicine Mountain	Lower Porcupine	Cattle	Carex	Stubble Height	7”	5.57”
Medicine Mountain	Upper Porcupine	Cattle	Carex	Stubble Height	7”	7.89”
Medicine Mountain	Upper Porcupine	Cattle	Carex	Stubble Height	7”	12.23”
Medicine Mountain	South Medicine	Cattle	Carex	Stubble Height	7”	7.81”
Medicine Mountain	South Medicine	Cattle	Carex	Stubble Height	7”	12.01”
Whaley Cr	Whaley Creek	Sheep	Carex	Stubble Height	5”	15.38”
Little Horn C&H	Willow	Cattle	Carex	Stubble Height	6”	5.9”

Allotment	Pasture	WL/ Cattle	Veg Type	Method Used	Standard	% Use or Residual Ht. Left
Little Horn C&H	Willow	Cattle	Carex	Stubble Height	6”	6.2”
Little Horn C&H	Willow	Cattle	Carex	Stubble Height	6”	8.7”
Little Horn C&H	Willow	Cattle	Carex	Stubble Height	6”	7.4”
Little Horn C&H	Willow	Cattle	Carex	Stubble Height	6”	6.4”
Little Horn C&H	Willow	Cattle	Carex	Stubble Height	6”	7.2 ”
Little Horn C&H	Wagon Box	Cattle	Carex	Stubble Height	6”	6.4”
Little Horn C&H	Wagon Box	Cattle	Carex	Stubble Height	6”	6.7”
Little Horn C&H	Wagon Box	Cattle	Carex	Stubble Height	6”	6.9”
Little Horn C&H	Wagon Box	Cattle	Carex	Stubble Height	6”	5.8”
Little Horn C&H	Trail-Kerns Flat	Cattle	Carex	Stubble Height	5”	18.9”
Little Horn C&H	Trail-Quaking Aspen Coulee	Cattle	Carex	Stubble Height	5”	18.12”
Little Horn C&H	Trail-#4 Coulee	Cattle	Carex	Stubble Height	5”	7.9 ”
Little Horn C&H	Trail – Clay Bank	Cattle	Carex	Stubble Height	5”	13.”
Little Horn C&H	Trail	Cattle	Carex	Stubble Height	7”	11.2 ”
Little Horn C&H	Horse	Cattle	Carex	Stubble Height	7”	11.2”
Little Horn C&H	West Burnt	Cattle	Carex	Stubble Height	7”	7.28”
Little Horn C&H	West Burnt	Cattle	Carex	Stubble Height	7”	6.8”
Little Horn C&H	West Burnt	Cattle	Carex	Stubble Height	7”	10.2”
Sage Basin	Below Camp	Cattle	Grass	Stubble Height Under Aspen	4”	5.19”
Sage Basin	Below Camp	Cattle	Grass	Stubble Height Under Aspen	4”	8.27”
Devil’s Canyon	Cookstove T2	Cattle	Carex	Stubble Height	4”	6.4”

Allotment	Pasture	WL/ Cattle	Veg Type	Method Used	Standard	% Use or Residual Ht. Left
Devil's Canyon	Cookstove T3	Cattle	Carex	Stubble Height	4"	6.3"
Devil's Canyon	Cookstove T4	Cattle	Carex	Stubble Height	4"	5.33"
Devil's Canyon	Cookstove T5	Cattle	Carex	Stubble Height	4"	7.26"
Devil's Canyon	Reservation Hole	Cattle	Carex	Stubble Height	6"	6.7"
Devil's Canyon	Lodge Grass (Gunstock)	Cattle	Carex	Stubble Height	6"	5.7"
Devil's Canyon	Lodge Grass (above Kerns)	Cattle	Carex	Stubble Height	6"	5.6"
Devil's Canyon	Lodge Grass (lower)	Cattle	Carex	Stubble Height	6"	7.5"

TONGUE RANGER DISTRICT

MONITORING REQUIREMENT:
Forage Utilization(Upland Range Sites)

The following Table displays results of browse transects in willow communities to monitor the amount of the current years growth removed by wildlife and livestock combined and in some cases wildlife alone. A summary of stubble height monitoring is included in the table above.

ALLOTMENT	PASTURE	WL/CATTLE	METHOD	% USE
Copper Crk/Upper Dry Frk	Copper Creek	Wildlife	Marked Twig	14
	" "	Cattle/WL	" "	62
	South Tongue	Wildlife	" "	35
	" "	Cattle/WL	" "	79
Lower Tongue	East Exp	Wildlife	" "	3
	" "	Cattle/WL	" "	84
	" "	" "	" "	85
	West Exp	" "	" "	50
	Little Willow	Wildlife	" "	30
	" "	Cattle/WL	" "	93
	Sheeley Creek	Wildlife	" "	0
	" "	Cattle/WL	" "	59

MONITORING REQUIREMENT:
Foragae Utilization (Upland Range Sites)

ALLOTMENT	PASTURE	MONITORED	VEGATATION TYPE	METHOD	UTILIZATION
CopperCrk/UpDryFk	Copper Crk	FS	Upland	Ocular	50%
	So Tongue	FS	POA	"	60+%
Freezeout	River	FS	Upland	Ocular	40-50%
	River	FS	Burned Area	"	50+%
	South	FS	Upland	"	35-40%
	South	FS	"	"	45-50%
	Hay Crk	FS	"	"	40-60%
	Hay Crk	FS	"	"	40-60%
	Hay Crk	FS	"	"	10-20%
	Dry Fork	FS	"	Clip	48%
	"	FS	Aspen	Ocular	50-55%
	"	FS	POA	"	60+%
	"	FS	Upland	"	40%
	"	FS	"	"	40-50%
	Schuler	FS	"	"	40-60%
	"	FS	"	"	50-60%
	"	Perm	"	Transect	SH 4.1"
Little Goose	High Country	Perm	Upland	Transect	SH 6.2"
	Little Goose	"	"	"	SH 6.9"
	"	"	"	"	SH 6.0"
	Campground	"	"	"	SH5.6"
	"	"	"	"	SH 7.5"
Little Goose	Kenniwood	"	"	"	SH 8.3"
	"	"	"	"	SH 9.7"
Little Goose Canyon	Canyon	Perm	Upland	Transect	SH 4.8"
Little Tongue	Shutts	FS	Upland	Ocular	20-25%
Lower Tongue	Bear Lodge	Perm	Upland	Transect	SH 6.8
	Sheeley	"	"	"	SH 7.1"
	W. Experiment	FS		Ocular	20-30%
	E. Experiment	FS	"	"	20-35%
	"	FS	POA	"	50-60%
Lower Tongue	North SU	FS	Upland	Ocular	35-50%
	Bear Lodge	FS	"	Clip	50%
	"	FS	"	"	45-50%
	Little Willow	FS	"	"	63%
	Sheeley Crk	FS	"	"	45%
	River	FS	"	"	27%
	Big Willow	FS	"	"	50%

ALLOTMENT	PASTURE	MONITORED	VEGATATION TYPE	METHOD	UTILIZATION
	Garden of Gods	FS	"	Ocular	50-60+%
	"	FS	"	"	50-60+%
	"	FS	"	"	50-60%
	Bull Creek	FS	"	"	50-60%
Lower Tongue	W. Exp.	FS	Upland	Clip	23%
	E. Experiment	FS	"	"	31%
Nicklemine	West Brush	FS	Upland	Ocular	40-60%
	East Brush	FS	"	"	40-50%
	River	FS	"	"	50-60+%
Prospect/Cedar	N. Prospect	FS	Upland	Ocular	30-50%
	Prospect	FS	"	"	30-50%
Upper Tongue	Highway	FS	Upland	Clip	47%
	"	FS	"	"	41%
	River	FS	"	"	31%
Allotment	Pasture	Monitored	Veg Type	Method	Utilization
	"	FS	"	"	40%
	Sidehill	FS	"	Ocular	40-60%
	"	FS	"	"	30-50%
	"	FS	POA	"	60%
Wolf Creek	Big Bend	FS	Upland	Ocular	60+%
	Bear Creek	FS	"	"	40-60%
	Sibley Creek	FS	"	"	20-30%
	Jaws	FS	"	"	50+%
Owen Creek	Big Willow	FS	Upland	Ocular	40-45%
	Owen Creek	FS	"	"	30-40%

MONITORING REQUIREMENT:
Range Condition & Trend

ALLOTMENT SAMPLED	PASTURE	VEGATATION TYPE	ANALYSIS DONE	APPROXIMATE STREAM LENGTH
Bull/Bruce/Woodrock	All	Riparian	Rip. Classification*	11.25 mi
Fool Creek	Fool	"	"	4.0 mi
Freezeout	All	"	"	20.5 mi
Little Tongue	Main	"	"	5.25 mi
Nicklemine	River	"	"	0.5 mi
Owen Creek	All	"	"	5.5 mi
Pass Creek	Back Country	"	"	3.0 mi
Pole Creek	N. Tongue	"	"	1.25 mi
Prospect/cedar	Prospect	"	"	1.0 mi
Upper Tongue	River/Hwy	"	"	5.5 mi
			Total	57.25 mi

Note: Many of the riparian areas along many of the perennial streams within these allotments were classified into existing plant communities using the 1997 Classification of Riparian Communities on the Bighorn National Forest. It was not possible to accurately determine trend in the initial application of the riparian classification but from the notes and photos taken will be able to determine site potential and changes from existing plant communities. Approximately 57 miles of riparian areas adjacent to streams and wet meadows were classified into numerous community types.

FOREST VEGETATION AND TIMBER OUTPUTS

Management of forest vegetation and resultant timber commodity outputs is included in this monitoring and evaluation section.

The 1999 Forest outputs in the timber are shown on the table of projected and actual outputs (table 3). The data in this report is from cut and sold reports, STARS reports, and planned accomplished records in the Forest RMRIS database. The Forest fourteen-year trend in timber management outputs is also shown in figure 3.

IMPLEMENTATION MONITORING
From chapter IV, Land and Resource Management Plan, Bighorn National Forest.

MONITORING REQUIREMENT:
Clear-cut Harvest Unit Size

Silvicultural prescription, sale design plans, sale maps, and on the ground layout of sales were reviewed for compliance with the maximum size limits; no created openings greater than 40 acres were found.

MONITORING REQUIREMENT:
Assure Regeneration within Allowable Time Frames of Final Harvest

In FY 1999, the Forest surveyed approximately 420 acres to determine the status of the regeneration on final harvest units, as defined in 36 CFR 219.27, in commercial timber sales. The 1999 surveys will be reviewed and certifications made from them in 2000. Continued monitoring, and/or corrective actions are planned for those areas not certified as regenerated. Surveys of past planting indicate good success. Cattle grazing heavily impacted the Fool Creek plantations in the past, but now the trees have grown such that they are considered stocked. Intermission fire area has an increased population of Pocket Gophers that are killing some seedlings, but at this time are survival is still acceptable. Because of inaccessibility and harsh conditions, Boyd Ridge plantations have lower than average success.

There have been non-traditional vegetation management projects implemented without silvicultural prescriptions on the Forest, including highway right of way expansion, ski area expansion, and habitat improvement projects. The policy is to have a silvicultural prescription prepared for all vegetation manipulation projects. Without a prescription, assurance of regeneration is not documented.

Off-site trees transplanted in the bowl quarry of highway construction have resulted in failure, with only a handful of the 3-4 foot transplants surviving. Current plans are to re-plant the area with native stock.

There is no evidence in the database of surveys to assure regeneration, or certification that past aspen regeneration treatments have met forest plan stocking requirements.

Qualitative surveys of recent wildfires have shown varied levels of regeneration. Without harvest, there is no legal timeframe to regenerate these wildfires, however, it is good management to monitor their progress. The Gold Mine fire along the southern edge of the Forest, and portions of the Lost fire have regenerated extremely well, to the point of overstocking. The more harsh sites on the Lost fire, and West Pass fire show

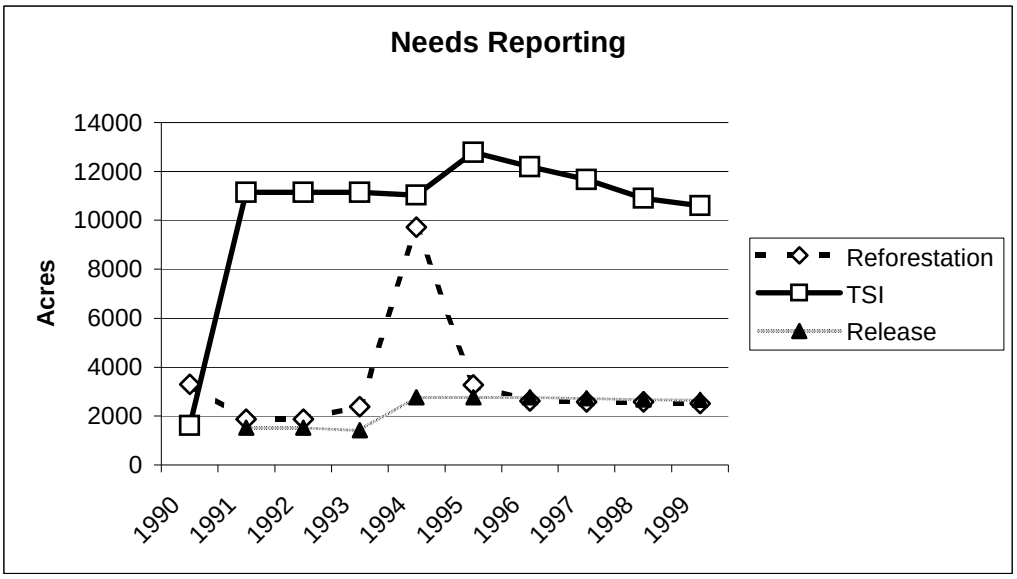
very little regeneration. Monitoring of these and other recent fires should continue to determine status of regeneration.

MONITORING REQUIREMENT:
Assure Reforestation and TSI Treatments are Current and No Backlog Created

The reforestation needs report in RMRIS shows, 2,517 acres needing reforestation (2,747 last year). The Forest needs to continue the commitment to the reforestation program to continue these successes.

The RMRIS database shows 10,592 acres (10,761 last year) needing Timber Stand Improvement (TSI), and 2,670 (2,678 last year) acres needing release. These figures have a low confidence level as many of the areas that were burned in wildfires or harvested ten to thirty years ago, and have grown dense and need thinning are not included in these needs. In addition, there are mature suppressed lodgepole which have historically shown little response to thinning that are included. In 1999, reduced funding allowed the Forest to only accomplished 225 acres of thinning and release.

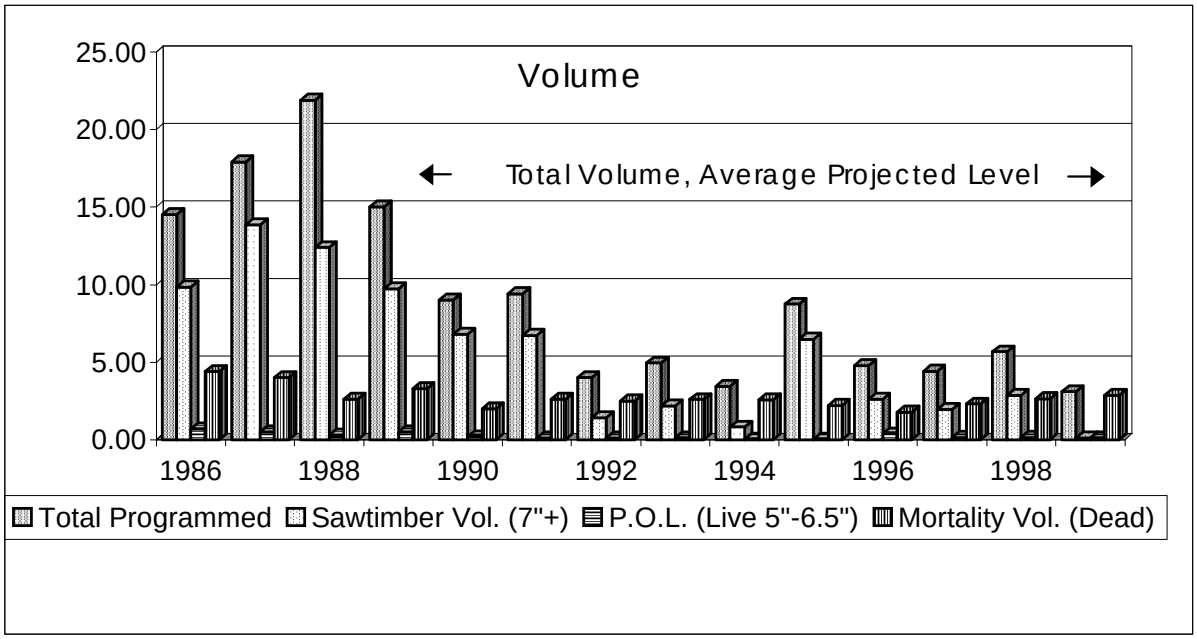
The past twelve monitoring reports recommended that the "needs" portion of the database for reforestation and TSI should be cleaned up. The reforestation database now reflects a more accurate assessment of our needs. Corrections to the “needs” section for TSI are still needed. In order to use this system to accurately calculate the "needs" for reforestation and TSI, the Forest will have to commit resources to maintaining the data, and cleaning up inaccuracies.



MONITORING REQUIREMENT:
Compliance with Schedule and Outputs

Current commercial timber outputs are below Forest Plan projections, except for mortality volume or fuelwood, as shown in table 3. The harvest acres by regeneration method are also below projected outputs. Funding and administrative limits have contributed to lower outputs than what was projected in 1985.

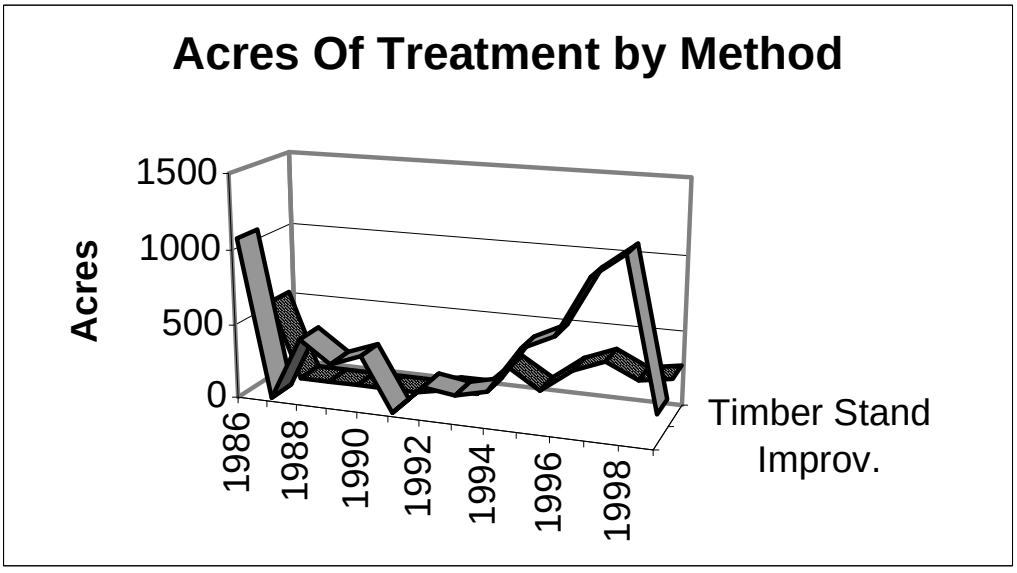
Through the end of FY 99, after fourteen years of implementation, the Forest has offered 31.9 MMCF (126.8 MMBF), compared to a projected output of 58.8 MMCF (228.6 MMBF), or 54 percent of the projected ASQ output (57% last year). The Forest has not identified a future timber sale program at the current Forest Plan sale quantity (ASQ) level. Current policy and projected budgets indicate a total sale program of around 5 to 7 MMBF including sawtimber, products other than logs (POL) and mortality volume.



The Ranger Districts continue to see demand for fuelwood and POL sales. Mortality volume sold (fuelwood) continues to exceed projections (201%). The amount in the Forest Plan schedule of outputs for mortality volume has been exceeded for the duration of the Plan. A more accurate projection of outputs should be derived during the Forest Plan revision process.

Thinning/release (TSI) projects were accomplished on 225 acres in 1999. Over the planning period, the Forest has accomplished 111% of the projected amount of TSI, but there still remains a substantial backlog of TSI to be done. A more accurate projection of thinning/release needs should be derived during the Forest Plan revision process.

The Forest completed 296 acres of tree planting and 32 acres of site preparation for natural regeneration. Scheduled planting in the Intermission fire area was not completed because the ground conditions dried up early making planting impracticable. 62 acres were found to be naturally regenerated and were certified. Over the planning period, the Forest has accomplished 45% of the projected amount of reforestation, up from 42% last year.



According to the Forest database no regeneration cutting of aspen was accomplished in 1999. Forest Plan objective was to treat 85 acres of aspen annually, to date the records show only 9% of that projected output met.

MONITORING REQUIREMENT:
Monitoring Standards and Guidelines

The standards and guides pertaining to vegetation management have a significant effect on the amount and kind of vegetation management allowed, and the resultant outcomes and outputs available this planning period, including sawtimber volume.

There is inconsistent interpretation of the standards and guidelines and how they are to be administered throughout the Forest. Standards are not being interpreted as a standard, but a minimum, with the optimum level above the Forest Plan standard. This has resulted in a different set of standards than those described in the Forest Plan, and different outcomes and fewer outputs than projected.

The Forest has received pressure to change standards and guidelines often and frequently when new studies, research or philosophies are proposed. This needs to be tempered with the need to apply consistent standards and guidelines over the planning period, as they are developed and applied in an integrated manner.

Current standards and guidelines for silviculture do not provide a full range of silvicultural methods. The current Regional Guide provides revised standards and guidelines for silviculture, that if adopted would help the Forest move towards ecosystem management.

Monitoring in 1999 has again identified a need for the Forest to clarify the requirements for certification of regeneration. Use of the Regional Guide standards is recommended.

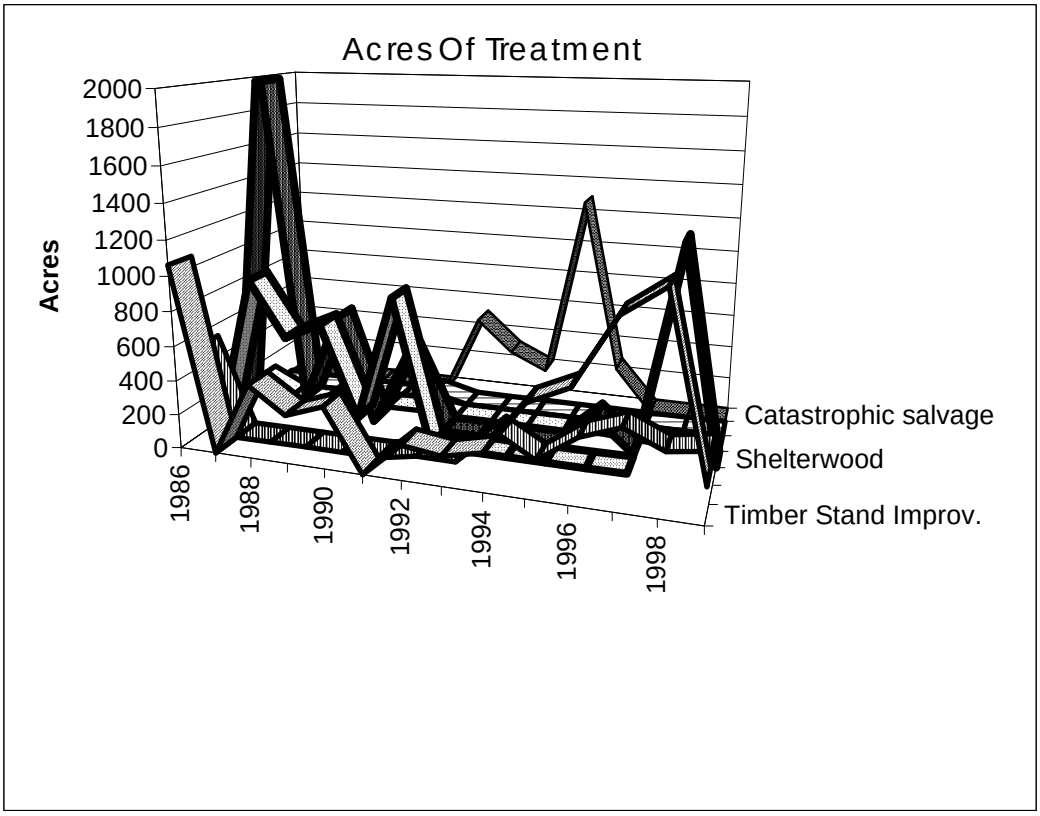
Validation

The acres of treatment by method from the Forest Plan are listed on table 3. Since the plan was implemented the Forest has not matched this prescribed mix. Total acres harvested are 43% of the total projected for the planning period while reforestation acres are 45% of the projected output, and ASQ is 54% of projected output. When the Forest revises the Plan, there should also be a concerted effort to re-examine the mix of each of these treatment methods.

The Bighorn National Forest management area designations have been found to be too small in size and too numerous in a given landscape to manage for a dominant use on a landscape scale. Landscapes currently do not have a dominant use, or management emphasis, but rather the management emphasis areas are averaged together. This averaging results in management for the average rather than managing for any particular emphasis area. Because of this, management areas are often overlooked in project initiation and implementation. This affects the ability to meet Forest Plan objectives, outcomes and outputs.

TABLE 3 - Review of Activity and Outputs - Forest Plan 1991-2000 Average

Activity	Unit of Measure	Projected Output	1986	1987	1988	1989	1990	1991	1992	1993	1994	1995	1996	1997	1998	1999	Total Projected Output	Total Actual Output	% of Projected Output
Total Programmed	MMBF	16.40	14.50	17.90	21.90	15.00	9.00	9.40	4.00	4.94	3.45	8.74	4.79	4.43	5.67	3.10	228.6	126.8	55%
Sale Volume Offered	MMCF	4.20	3.30	4.70	5.80	4.00	2.30	2.50	1.00	1.17	0.88	2.16	1.11	1.03	1.15	0.81	58.8	31.9	54%
Sawtimber Vol. (7"+)	MMBF	14.50	9.85	13.86	12.39	9.72	6.80	6.72	1.40	2.16	0.82	6.48	2.62	1.97	2.85	0.11	203.0	77.7	38%
Sawtimber Vol. (7"+)	MMCF	3.80	2.58	3.63	3.25	2.55	1.78	1.76	0.37	0.57	0.19	1.57	0.56	0.41	0.63	0.03	53.2	19.9	37%
P.O.L. (Live 5"-6.5")	MMBF	0.50	0.70	0.50	0.30	0.50	0.20	0.10	0.10	0.13	0.05	0.04	0.38	0.16	0.16	0.13	6.5	3.5	53%
P.O.L. (Live 5"-6.5")	MMCF	0.08	0.11	0.08	0.05	0.08	0.03	0.02	0.02	0.02	0.01	0.01	0.10	0.04	0.04	0.02	1.0	0.6	61%
Mortality Vol. (Dead)	MMBF	1.40	4.40	4.00	2.60	3.30	2.00	2.60	2.50	2.59	2.58	2.22	1.79	2.30	2.66	2.86	19.1	38.4	201%
Mortality Vol. (Dead)	MMCF	0.37	1.16	1.06	0.69	0.87	0.53	0.69	0.66	0.68	0.68	0.59	0.45	0.58	0.48	0.76	5.0	9.9	196%
Timber Stand Improv.	Acres	400	1060	0	426	280	357	0	200	170	220	519	622	1009	1169	201	5,600	6233.0	111%
Reforestation	Acres	360	525	0	0	0	0	0	40	40	242	113	272	355	255	290	4,790	2132.0	45%
Clearcutting	Acres	1,194	22	881	555	657	118	852	0	0	0	0	0	124	43	0	15,571	3252.0	21%
Shelterwood	Acres	625	52	2,159	108	629	10	458	0	0	0	0	202	14	1227	0	8,625	4859.0	56%
Uneven-aged Selection	Acres	100	106	0	0	0	13	17	0	0	0	0	15	0	0	0	1,495	151.0	10%
Commercial Thinning	Acres	0	0	0	0	0	0	54	0	0	0	0	0	0	0	0	none	54.0	n/a
Catastrophic salvage	Acres	0	0	0	0	0	0	0	486	297	198	1,282	256	0	0	0	none	2519.0	n/a
Other	Acres												84	0	10	0	none	94.0	n/a
Total of Area Cut	Acres	1,919	180	3,040	663	1,286	141	1,381	486	297	198	1,282	557	138	1280	0	25,691	10,929	43%



Caribou Timber Sale
IMPLEMENTATION MONITORING

The Caribou timber sale decision notice was signed in March, 1998. An implementation monitoring plan was prepared in May, 1998, and was updated in February, 1999. The monitoring plan tracks implementation of the actions specified in the Decision Notice. To date, the following implementation monitoring activities have occurred:

- Caribou Monitoring, 10/9/98: Detail of activities associated with sale preparation and layout, including unit acreages and snag island acreages in comparison to EA estimates; volume shortfall between EA and contract; and installation of 9 photo points to monitor silvicultural activities.

- Caribou Timber Sale Environmental Coordination and Certification, 9/30/98: Contract preparation checklist to ensure that items in the selected alternative were included in the timber sale contract.

- Regional Silviculturist Review, 12/29/98: The Regional Silviculturist reviewed the silvicultural prescriptions and marking in response to a complaint that the actual implementation did not follow the actions specified in the EA and Decision Notice. The review found that "The silvicultural prescriptions for the Caribou Timber Sale are technically sound and have a high probability of achieving the management objectives set out in the Decision Notice and Environmental Assessment for the area."

- Hydrology Field Review, 8/11/99: This review became a subject for the Forest Plan monitoring trip, which is discussed earlier this report.

- Scenery Monitoring, 1/28/00: The Forest Landscape Architect reviewed the 1999 logging, and determined that the Forest Plan Standards and Guidelines were met. The report includes pictures and a narrative documenting how and why the S&Gs were achieved.

Caribou Timber Sale
Effectiveness Monitoring

Some of the watershed restoration measures specified in the Decision Notice were completed in September, 1998. A field visit, which included pictures, was done in October, 1998 on FDR 533111 to establish an effectiveness monitoring baseline. FDR 533111 was revisited in July and August, 1999, and the following was concluded:

- The stream banks should have been more sloped, or less steep, than as implemented. The fill material removed was still within the riparian area, and should have been better stabilized.

- The amount of revegetation was not satisfactory to achieve the Forest Plan standard and guideline on page III-57 of reducing erosion and sediment yields to a natural rate within the season of disturbance and one year of the activity, respectively. The reason for the revegetation failure is not clear, as even the seed species mix was not known. Further stabilization work, which may include additional seeding, silt fences or matting, is planned for summer, 2000.

INSECTS AND DISEASE
Program Summary

Aerial surveys were conducted along the eastern foothills of the Bighorn Forest in 1998, and were summarized in a letter to the land management agencies of the state dated May 20, 1999. Portions of this letter are paraphrased below. Per agreement with the Forest Health Management Service Centers complete Forest surveys are conducted every three years. They were last completed in 1997, and will be scheduled again in 2000.

Below is the status of insect and disease pest populations noted on the Forest in 1999.

Tensleep and Leigh canyons on the Powder River District continue to show effects of mountain pine beetle (*Dendroctonus ponderosae* and White Pine Blister Rust (*Cronartium ribicola*). Surveys taken this summer indicate 66% of the limber pine is infected in the Tensleep canyon (Harris 1999). These surveys indicate a low to moderate infection throughout the limber pine cover type on the Forest, with 18% of the northern stands infected. This rust has been estimated to be present in the Bighorn Forest for 30+ years (Brown 1978). Forest surveys have identified increased infection in the past 10 years; additional areas include Poverty Flats along the Big Goose road, and the northeast face of the Bighorns. Limber pine is a white pine that is very susceptible to this rust disease (Hoff et al. 1980). Although limber pine has not been a marketable timber species, it is a main vegetative component for many harsh sites in the Rocky Mountains. Limber pine often grows in pure stands on droughty, windy sites where often no other tree, and sometimes no other vegetation, can grow (Kendall and Schirokauer 1997). White pine blister rust disease may be causing tree mortality and deforestation of these sites.

The lodgepole needlecast fungus (*Lophodermella montibaga*) continues to be on the decline with no known epicenters detected in 1998 and 1999.

Widespread damage to the subalpine fir cover type is identified as subalpine fir decline. This decline is poorly understood, but is thought to be a combination of insect (western balsam bark beetle, *Dryocetes confuses*) and disease (*Armillaria* or root disease) contributing to tree decline and mortality. This is seen as dead subalpine fir, with the brown needles retained on the limbs for a number of years after death, from a few acres in size to individual subalpine fir trees.

Mountain pine beetle (*Dendroctonus ponderosae*) is seen in increasing levels along the eastern foothills. Many small pockets, along with a few larger pockets, were found scattered throughout the area, with concentrated mortality in the vicinity of Horse Creek Ridge north of the Tongue

River; below Steamboat Point long and mostly below highway 14; and throughout the foothills west and northwest of lake De Smet which includes the community of Story (McMillin 1999).

Dead tops of Lodgepole Pine continue to be observed throughout its range, with area that from a distance look gray from all the weathered tops. Most of this is caused by Comandra blister rust (*Cronartium comandrae*) that kills the tree from the top down. As most of the cones are produced near the top of Lodgepole pine, this reduces the amount of seed produced to regenerate these stands.

The area not salvaged from the 1993 "microburst" is still a concern. While no surveys were conducted in 1999, visual observations of Spruce Beetle populations showed no epicenters. If there is a significant increase in spruce beetle populations in these areas, actions may be necessary to keep the beetles from adjacent standing forested stands.

The East Duncum area has also experienced tree mortality in and around past harvest sites. Surveys planned for 1999 did not take place, and need to be rescheduled for next summer.

Gypsy Moth trapping on Forest and by cooperating agencies off the Forest has been ongoing. Continued detection monitoring is needed to keep this exotic pest from becoming established.

IMPLEMENTATION MONITORING

MONITORING REQUIREMENT: Compliance with Schedule and Outputs.

The forest plan projected 800,000 acres of survey to be done annually. These aerial surveys are conduced every three years through the zone Forest Health Management office. Additional surveys are conducted to help evaluate specific concerns, and this year they were conducted along the eastern edge of the Bighorns to assess the Mountain Pine beetle populations, reported above.

Effectiveness Monitoring

Aerial surveys are effective in determining levels of infestation of various pests, but are not cost effective annually. Ground validation and sampling is necessary to determine the exact forest pest, population levels, and what if any management actions may be warranted.

C. SOCIAL COMPONENTS

RECREATION AND VISUALS
Program Summary

Forest visitation decreased in 1999 by 1.7 percent. Highway traffic was down by 2 percent on US 14 and up by 2.4 percent on US 16. No doubt, construction on Highway 14 and the cool wet spring contributed to these shifts in use. Gallatin Canyon Campgrounds, a division of Canyon Enterprises, Inc., again operated most of our developed recreation sites. For the most part, users were pleased at the service provided by this concessionaire.

All 3 interpretative sites (Burgess Junction, Shell Falls, and the Medicine Wheel) were operated during the summer season. Use was down at both Shell Falls and Burgess Junction by approximately 5 percent over the same period last year. Visitors to the Medicine Wheel totaled over 13,900, down from 17,400 in 1998. Interpretative sales through the Rocky Mountain Nature Association totaled $171,000. Proceeds from these sales pay for interpretative staff and publication of new interpretative materials. The Association operates sales

outlets in other National Forests throughout the Rocky Mountain Region and the State Park system in Colorado. The Bighorn National Forest is the top sales producer of all operated outlets. Robert Larson coordinates this program and oversees the operations of all 3 facilities. Bob recently received the Gifford Pinchot Award for being the "Outstanding Interpreter" in Region 2.

Construction of Tie Hack Campground continued throughout the summer of 1999. We anticipate an opening date in May, 2000. This facility, consisting of 20 camping sites, was completed as part of a mitigation plan to replace a campground flooded by the Tie Hack Reservoir. This 69 acre lake, supplying the City of Buffalo with drinking water, provides excellent recreation opportunities including, picnicking, fishing and boating. The Forest completed several other recreation projects including the Crystal Creek Snowmobile Parking Facility and a new restroom in the vicinity of the Medicine Wheel National Historic Landmark. In addition, the concessionaire upgraded several campgrounds with new fire rings, graveling of the access road to Doyle Campground (FDR 514) and installation of entrance gates at 4 recreation sites. Total concessionaire expenditures exceeded $10,000. Although these repairs were important, a substantial backlog of maintenance remains due to the age of must facilities.

As part of a nation-wide effort, the Forest began a program of inventorying its developed recreation infrastructure. This includes collecting information on the number, location and condition of such facilities as fire rings, grills, tables, and vault toilet buildings. This data will provide accurate dollar estimates for future funding of backlog maintenance. In 1999 we completed an inventory of 25 recreation sites, primarily on the Tongue Ranger District. In addition, 180 miles of trail were surveyed or approximately 20 percent of our total miles. As with the recreation sites, trail condition was documented and areas of needed improvements noted.

Participation in dispersed motorized recreation activities continues to grow. Increased use of ATV's during the summer and fall seasons and snowmobile use during the winter season are reported in most Forest areas. This creates challenges for managing the recreation program including law enforcement, maintenance, trail/road damage and user conflicts. Resource damage problems continue to increase in the areas designated "C" on the Forest travel map. Motorized vehicles in these areas are authorized to travel off of roads and trails. Many miles of user created trails occur through meadows and streams.

During the summer season, we focused additional resources on some dispersed recreation activities. These included: establishing an ATV check station for spark arrestors on July 3, 1999 at Park Reservoir, law enforcement patrols with assistance from the Black Hills on the Powder River District during the fire ban, full time radio dispatch, and coordination with volunteers for increased presence on the ground.

A seasonal employee presented the Tread Lightly education program in schools in eight communities surrounding the Bighorn National Forest. Approximately 1,000 students were contacted with a message emphasis of minimum impact use of the environment.

Volunteer groups and individuals were used throughout the forest to help manage the recreation program including trail maintenance, campground and facility maintenance, signing, patrols, visitor contacts, interpretation at visitor centers and grooming cross country ski trails.

IMPLEMENTATION MONITORING

MONITORING REQUIREMENT: Developed Recreation Use

Recreation visitation in our campgrounds and picnic areas, Forest-wide, was down 2.9 percent in 1999 over the previous year. Likewise, use at our visitor centers was down by 5 percent. A closer look at trends along our major travel corridors provides more insight to these general declines. Facilities, along US Highway 14 (Big Horn Scenic Byway) and 14A (Medicine Wheel Passage) experienced the greatest drops in use. Most campgrounds were down over 15 percent from 1998. Several, including Prune Creek, Cabin Creek, and Porcupine Campgrounds had declines of up to 50 to 70 percent. Highway construction in the vicinity of Sibley Lark caused extensive traffic delays. Many visitors choose to use Highway 16 as their preferred travel route over the Big Horns. Visitation at most developed sites along US Highway 16 (Cloud Peak Scenic Byway) increased. Campgrounds located west of Buffalo, Wyoming had increases of over 20 percent. Data indicates that 37 percent of all campground visitors used tents, 47 percent had trailers or truck campers and the remaining 16 percent had motorhomes.

Significant construction projects in 1999 included: Tie Hack Campground – a new development with 20 camping sites just west of the Tie Hack Reservoir; Crystal Creek Snowmobile Parking area – a road-side rest stop just east of the Forest boundary along US Highway 14A (Medicine Wheel Passage); and new restrooms at the parking area for the Medicine Wheel National Historic Landmark.

Operation of most developed recreation facilities continued under the terms of a Special Use permit to Gallatin Canyon Campgrounds, a division of Canyon Enterprises, Inc., with offices in Bozeman, Montana. Campgrounds were generally kept in excellent condition. The Forest will work with the concessionaire to solve problems where insufficient service was noted.

Volunteers play a critical role in providing public service. We operated Tyrell Ranger Station, as in the past, by volunteers. Offices are not routinely open at times convenient to the Forest visitor. Lack of funding limits available options for keeping these facilities open.

MONITORING REQUIREMENT: Site Facility Condition

Although most developed facilities continue to deteriorate due to their extensive age (many build during the 1930's with few improvements), some repairs were made in 1999. The concessionaire painted and stained vault toilet buildings and barriers, installed entrance gates on 4 campgrounds, replaced nearly 30 fire rings, and graveled segments of the access road to Doyle Campground.

We prioritized maintenance at other recreation developments to comply with health and safety requirements (e.g., hazard tree removal, water system testing). The majority of campgrounds need redesigned to accommodate larger recreational vehicles. Minor improvements, with the help of volunteer labor, were completed on the Bucking Mule Falls Trailhead (rebuilt stairs, refurbished the restroom exterior). Extensive reconstruction to the support beams on the viewing bridge at Shell Falls was completed in the fall of 1999. Replacement of the interpretive signs and repairs to other on-site improvements at Shell Falls are still needed.

MONITORING REQUIREMENT: Dispersed Recreation Use & Experience

There were 3 dispersed recreation personnel assigned to Forest patrol during the 1999 summer season. Duties included maintenance, signing and law enforcement. These employees are challenged with increasing numbers of recreation users and violations.

Traffic counters on the Powder River Ranger District indicate that for some areas (i.e., West Tensleep Lake Road) on some weekends and holidays, the number of visitors may be exceeding Forest Plan guidelines. This is of short duration, but indicates a need to develop management strategies to deal with increasing visitor numbers. The Forest continues to see the development of new recreational activities (e.g., rock climbing in Tensleep Canyon and Crazy Woman Canyon). Lack of funding prevents adequate monitoring of these and other uses.

During the summer of 1999, one volunteer focused on patrolling the Park Reservoir area. This was a direct result of a decision to resolve travel management concerns made in 1997 (Little Goose/Park Reservoir Travel Management Plan). Increased presence in the Park Reservoir area has reduced user conflicts, limited the number of visitor complaints and lowered the number of other forest violations. The Tongue Ranger District also improved signing and made numerous visitor contacts in and around the Black Mountain Road (FDR 16) and the Woodrock Ranger Station. Signs were placed to identify areas of no camping within the one-quarter mile closure on FDR 26 and sites requiring restoration. Compliance was good once the signs were in place.

Dispersed long term trailer camping continues to be a major concern. Use is increasing every season and accompanied by more resource damage. Numerous access roads to the same sites or group of sites are created resulting in soil compaction. The public is not aware that compaction of soils to the point that vegetative growth is inhibited, is considered resource damage.

We completed an inventory of dispersed campsites in the summers of 1998/1999 at several major use areas. Twenty (20) percent or more of all sites inventoried were exhibiting conditions (Frissell Condition Class 4 and 5) that would not meet Forest Plan standards (e.g. unacceptable erosion, tree damage, lack of vegetation). Inventoried sites will be entered into a GIS database to aid in Forest Planning. This past summer we cleaned up several campsites with structures being dismantled or hauled to the landfill.

The number of horse users camping at dispersed sites is also increasing. A recent development is a greater number of out-of-state recreationists bringing horses to the Bighorn National Forest. In addition to the resource damage and sanitation concerns that result from all dispersed use, horse confinement creates trampling of vegetation, damage to trees, and water pollution.

Use during hunting season continues to have a big impact on the resource due to the wet road conditions. Hunter patrols prior to opening day are effective, however with our limited number of employees it is impossible to contact every camp. Continuation of these patrols is recommended as many problems are resolved as situations arise.

It is further recommended that the Forest revise the 14 day camping order, implement a more aggressive education program, determine acceptable limits for dispersed camping and provide alternatives to facilitate this use. This may include creating a larger group use area where campers could pay an established daily fee and leave their recreational vehicles for an extended period of time. This would accommodate those who enjoy social interaction. Other alternatives should address users that prefer sites offering more solitude.

MONITORING REQUIREMENT:
Off-Road Vehicle Damage

Evidence of off road and trail vehicle use continues to increase. The Powder River Ranger District contains the largest (in acres) designated off-road travel area on the Forest. Unacceptable resource damage continues to grow in this “C” area. Due to lack of funds and available personnel, some

ATV users refuse to follow established regulations knowing that the likelihood of being caught is minimal. Young children drive ATV's off-road as well as on the Forest Development Roads. Damage occurs during hunting season with people paralleling roads to avoid ruts, snow, or mud resulting in additional two tracks being created. Snowmobiles are being used before the legal date, November 16th, by hunters and recreationists. It is recommended that the Forest work aggressively to solve these travel management problems. In addition, a lack of maintenance on many secondary roads is contributing to erosion and lower water quality.

MONITORING REQUIREMENT:
Trail Construction and Reconstruction

We accomplished approximately 1.5 miles of trail reconstruction in 1999 (East Tensleep Lake Trail Reroute). Other volunteer groups cleared downfall on over 160 miles of trails and did extensive drainage work on an additional 5 miles of trail. Volunteer groups included the Cloud Peak and Powder River Back Country Horseman, and the Washakie County Search and Rescue. In addition, the environmental science class at Sheridan High School volunteered to make trail improvements to the Tongue River Trail and Cave. Approximately 75 students participated in reconstructing and rerouting the trail and removing 150 pounds of garbage from the cave itself. They displayed their collection at the science wing of the high school. This group was awarded the Chief of the Forest Service's Volunteer Program National Award for Youth Volunteer Service. This was one of only seven awards in this category nationwide.

Sheridan County Search and Rescue helped to make trail improvements to the Little Bighorn Trail on National Trails Day.

For the first time, this year funds were available to conduct a trail condition survey (deferred maintenance**).** Twenty percent (20%) of our Forest trail system, approximately 180 miles were surveyed this summer. Until this past field season we relied on outdated survey information to prioritize segments of trail requiring corrective action. Analysis of this years deferred maintenance survey, coupled with observations from field personal and public trail users, confirms that the high priority list of critical maintenance needs is increasing. Overall trail conditions on the Forest continued to decline. Trail erosion with resulting resource degradation is at unacceptable levels.

Deterioration of the Forest Trail system bridges is at a critical stage. Lack of funding has prevented routine bridge inspections. Guidelines call for checking approximately 20 percent of trail bridges each year. Plans are underway to re-institute this program in the summer of 2000.

Despite a funding shortage, the Forest trails team continues to update and prioritize trail maintenance needs.

Monitoring Addition: Law Enforcement

The following table summarizes the number of law enforcement incidents (Incident Reports, Warning Notices, Violation Notices) beginning in 1994. Detailed data on specific types of violations (e.g., timber thief, fire violations, off-road vehicles,…) is available at our offices in Sheridan, Wyoming. Reporting incidents is a function of a number of field personnel.

	1994	1995	1996	1997	1998	1999
Number of Reported Incidents	1379	622	1066	1215	784	765

MONITORING REQUIREMENT:
Scenery Management

On November 13, 1999, the Forest Landscape Architect conducted a monitoring field trip to review work on the Caribou Timber Sale. The purpose was to evaluate the visual impacts of harvest activities in relation to Forest Plan standards. The results of that analysis are as follows:

Caribou Timber Sale

The harvested area is on a ridge lying southeast of Pole Creek. It's bordered west by the Pole Creek Road #31 (collector road).
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The Forest Plan prescription in this area sets a minimum standard for visual quality of partial retention in the foreground view from Pole Creek Road. A partial retention visual standard allows for management activities that are evident but remain visually subordinate to the characteristic landscape. The activities must repeat elements of form, line, color and texture, but may change the size amount, direction or pattern of the elements. The pattern and texture created were visible, but did not dominate the naturally occurring landscape. The activity met the partial retention visual standard (See Figure1)

Figure 1

The 7E prescription sets a minimum standard for visual quality of modification for areas outside the foreground zone of arterial or collector roads and primary trails. The modification visual standard allows for management activities that dominate the characteristic landscape. Slash, root wads, berms and other features associated with vegetative alteration must remain visually subordinate to the landscape composition to meet the modification standard. The level of debris in these areas fully met the modification standard. The contractor reduced slash height well below the "eighteen inches above ground" maximum slash height in the contract requirements. This significantly reduces the negative visual impacts of the recent harvest. Bringing more slash in contact with the ground might also hasten natural decay and decomposition. A 12 inch maximum slash height should be considered for future contracts. (See Figure 2).

At some locations within the sale we placed a concentration of root wads and slash to block ATV and other vehicular use of closed roads (i.e., #534311). The effectiveness of this material as a closure device is undetermined. The concentration of slash calls visual attention to the area and is at the low end of the modification standard (See Figure 3).

← (Figure 2)

In conclusion, the Caribou Timber Sale harvest and related activities completed during the 1999 field season met the visual quality objectives for the Forest Plan. Additional monitoring is planned after harvest of other Caribou Timber Sale units.

← Figure 3

Effectiveness Monitoring

Lack of funding and personnel are the greatest challenges to providing a quality recreation program on the Bighorn National Forest. Recreation use continues to slowly increase placing additional demands on resources already taxed to their limits. The use of snowmobiles and ATV's is becoming more popular. The potential for resource damage with this equipment is much greater. All of these demands call for immediate attention. With a renewed emphasis on collecting and analyzing information on operations costs, we hope that additional funding can be justified. Nevertheless, it appears that the public will be asked to help through an even greater use of volunteer programs and/or through a greater share of their resources by initiating new user fees.

As stated in previous monitoring reports, management of dispersed recreation is the most important emphasis area for the future.

Validation Monitoring

As the Forest moves forward with new planning efforts, some of the initial flaws in the current plan are being addressed. Previous concerns over use of ROS (Recreation Opportunity Spectrum) guidelines for Management Areas have been adjusted. Specifically, the building of roads in areas set aside to maintain Semi-Primitive Non-motorized experiences will be the exception in future planning. Plans are underway to develop new capacity determinations. These changes will be available for public review in the upcoming Forest Plan Revision.

WILDERNESS
Program Summary

The Forest was able to fund 4 seasonal Wilderness Rangers for the field season of 1999. However, less time was spent on educational efforts and Leave No Trace outdoor skills and ethics training. This was partially due to reorganization efforts that occurred in 1998. The primary wilderness staff position was combined with the recreation staff position on the Powder Pass Ranger District as a means to more efficiently allocate funds. The result is less time available for wilderness coordination. Some of these former duties were reassigned to other District staff.

Wilderness use in 1999 was up by approximately 10 percent over the 1998 season. Most other Forest activities showed a decline (1.7 percent overall reduction in Forest visitation).

We continued to monitor air quality by intensively sampling water quality at 3 Wilderness lakes. A "visibility camera", aimed at Mather Peaks, operated for its fifth year. Two search and rescues occurred during the summer of 1999. One was in the Lake Solitude area (lost hiker) and the other was an evacuation of a Boy Scout from the Cloud Peak area (broken ankle). Fifteen violation notices were issued in 1999; 7 for camping within 100 feet of water, 4 for campfires within 300 feet of a lake, 2 for entering the Wilderness without a completed registration, and one each for being over group limit size and hitching livestock within 100 feet of water. This was a decrease of 4 violations from 1998.

The fifth full year of mandatory registration was completed in 1999. Compliance exceeds 95 percent.

MONITORING REQUIREMENT:
Condition of use areas

No monitoring of use areas (campsites) occurred this year. The Forest completed a "Revision of the Wilderness Standards and Guidelines" in September, 1998. Campsites are scheduled for monitoring in the summer of 2001.

MONITORING REQUIREMENT:
Amount and distribution of wilderness use

Use for 1999 totaled approximately 65,000 RVDs (Recreation Visitor Days). This is just slightly more than a 10 percent increase from the 1998 use of 61,000 RVDs. Average length of stay remains at one night as it has for the last ten plus years. The distribution of users remains at 85 percent hikers and 15 percent horse users. Visitor counts are based on the mandatory self-registration system started on July 1, 1994. Compliance with self-issue registration is around 95 percent for visitors entering at a major Trailhead with a registration box. Wilderness visitation remains concentrated at trailheads accessed from US Highway16**. More than 80 percent** of the visits to the Cloud Peak Wilderness occur through access off of US 16. The more difficult to reach northern and northwestern points receive less than 20 percent of the total use.

Effectiveness Monitoring

Similar to the recreation program, the lack of funding will be the greatest challenge in Wilderness management in the next decade. More reliance on volunteers will be needed to accomplish many of the necessary tasks. We will also rely on more innovative techniques to accomplish goals. Self-issue registration and compliance have improved use estimates. Prior to the mandatory system, registration was voluntary and compliance averaged about 50 percent for hikers and about 20 percent for horse riders. Compliance for the mandatory registration approaches 95 percent. The use estimate confidence level is much higher with improved registration.

Validation Monitoring

The new Standards and Guidelines set in the fall of 1998 with the Forest Plan Amendment will not be used for inventory purposes until the summer of 2001. It is anticipated that the new Standards and Guidelines will more easily show the trend of campsite conditions.

HERITAGE RESOURCES
Program Summary

Approximately 16,225 acres were surveyed for Heritage Resources on the Bighorn National Forest during Fiscal Year 1999. The majority of survey included 11,440 acres for wildlife habitat improvement, 1,990 acres in support of range management, 755 acres for timber management, 1,555 acres for prescribed fire management, 500 acres for the heritage resource program, 100 acres during wildfire suppression, and 15 acres for facilities management. Additionally, twenty previously recorded sites were re-examined to determine their condition. Finally, the Forest initiated a Programmatic Agreement among the Forest Service, the State Historic Preservation Office, and the Advisory Council on Historic Preservation for the streamlining of heritage resource surveys in connection with the prescribe fire program. The Programmatic Agreement should be completed by the fall of 2000.

Public education for the year included four flint knapping demonstrations, one historic photographic display, and a class at Sheridan College. Personnel from the District held several talks that took place at the Burgess Junction Visitor Center. The programs include the Sibley Battle, flint knapping demonstration, and a prehistoric technology workshop.

IMPLEMENTATION MONITORING

MONITORING REQUIREMENT:
Evaluation of Ground Disturbing Activities
Protection of Significant Cultural Resource Properties

Twenty Heritage resource properties were examined on the Bighorn National Forest. Ten of the properties were prehistoric, seven were historic, and three sites had both a prehistoric and historic component. Nine of the prehistoric sites are being impacted by erosion caused by the presence of roads and cattle grazing, rodent disturbance, and vandalism. The last prehistoric site is being impacted by wildlife grazing and natural deterioration of features made from limestone. All of the impacts to the prehistoric sites are considered threatening to these sites eligible status. At present, mitigations for the properties are planned through grazing permit renewal or by dollars generated in the Forest Service's deferred maintenance program. Mitigation is proposed to begin in 2000 and should be completed by 2007.

All seven historical sites are receiving impacts from natural deterioration, three sites are being impacted from cattle grazing, and two of the sites, historic mines, are being impacted from inappropriate recreational gold panning. The impacts are at a high enough level that the sites eligibility for inclusion as historic sites is threatened. Through grazing permit renewals and deferred maintenance, four of the sites will receive site mitigation within the next ten years. The remaining sites, all historic roads, have no specific plans to lessen on-going impacts at this time, although a potential for funding is present within the Forest's deferred maintenance program.

Effectiveness Monitoring

Two goals are associated with effective Forest Plan Monitoring. They are: 1) ***identification of appropriate resource management***, and 2) ***initiate actions to reduce deficiencies***. The Forest has raised its emphasis to a level to sufficiently address goal 1. This has been accomplished through the grazing permit renewal process, early planning for wildlife projects, and by the initiation and funding of the deferred

maintenance program. A necessary addition is the need to monitor at least one addition field project as defined under the Monitoring Requirements Section, Requirement 1.

The Forest has initiated several Programmatic Agreements in the past few years, and this year the Forest will complete a new Programmatic Agreement for the Prescribed Fire Program. These agreements state specific direction in the management of heritage resources, which assist the Forest in reaching a high level of effectiveness in meeting goal two. The Forest now has standard procedures for reducing effects from range, travel management activities, and within the near future, elements of the fire program. Additionally, the Forest has management plans in place for the Medicine Wheel National Historic Land Mark, the Woodrock Tie-Hack Historical District, and is presently working on plans for historical administrative sites, as well as prehistoric sites. The primary challenge that faces the Forest in the next few years is to update the Heritage Resource database so it can be used to track and help analyze the actions being implemented in order to determine if the actions were appropriate, and assist the Forest in future planning.

Validation Monitoring

The Forest Plan goals and objectives are lacking in most areas regarding Heritage Resources. The laws that they were based on have been amended, and present direction in the Forest Plan is inadequate and/or inconsistent with the new amendments. For example, monitoring requirements should include reporting the extent that the Forest is reducing its backlog of unevaluated sites. Additionally, the Forest Plan gives no assistance in setting priorities to fulfill recreational needs. However, with new direction from the Forest Service's Washington Office, the Forest is in the process of assessing its Heritage Resource assets. This action will reduce evaluation backlog, and establish sufficient long-term achievable monitoring goals that will include yearly maintenance priorities for sites that are incurring impacts. As noted above, the Heritage Resource database needs to be updated so it can help track and analyze trends on the Forest.

Evaluation and Conclusions

The 1999 monitoring program reflects that the Bighorn National Forest continues to have impacts to heritage resources by natural deterioration, grazing activities, vandalism, recreation activities, and wildlife activities (i.e. burrowing rodents). Two main reasons are associated with deficiencies with the management of the resource on the Forest. They are: 1) the Forest Plan needs to be amended to give specific direction in the meeting of Federal Law, and 2) funding levels are just too low to implement the Forest Plan (see Recommendations). However, Programmatic Agreements and new Forest policy and funding orientations should bring the Forest to, or near an acceptable level of Heritage Resource management within the next few years.

LANDS - SPECIAL USES

Program Summary

The Lands and Special Uses Program on the Forest consists of real estate management including land acquisition and adjustments, withdrawals, public access, and the administration of a wide variety of special use authorizations, including permits, leases, and easements.

We administer approximately 500 authorizations, including 150 non-recreation uses such as communications sites, municipal and agricultural reservoirs, pipelines, power lines, roads, and a variety of miscellaneous uses. In addition, the Forest permits approximately 365 recreation uses, including outfitter/guiding operations, recreation residences, 10 resorts, 2 ski areas, recreation events and a Forest-wide campground concession permit. The Bighorn, with 265 summer home permits,

has the most recreational residences in the Rocky Mountain Region.

In addition to the administration of existing permits, the Forest receives many new applications annually. The special uses staff reviewed and processed new permits for several resorts and one ski area, several road easements, and is currently working on an easement for the City of Sheridan's water supply. District Staff reviewed and processed new permits for re-issuances of recreation residences, and recreation events. The construction of a large FM broadcast tower at Bosin Rock Communications Site on the Tongue District was completed this summer, although further work with the company needs to be done to reach compliance with visual standards. The reappraisals of several reservoirs on the Forest resulting in higher fees, precipitating appeals to the Regional Forester and Washington Office. The Forest was upheld, and the reservoir companies were billed the higher rates. It is possible that the reservoir companies will now seek relief through the courts.

The Forest implemented a new information system called SUDS (Special Use Data System) in 1999. This computer program not only keeps track of each permit, but allows special-use administrators to do more efficient billing.

We dismissed, using the new CFR (Code of Federal Regulations) screening regulations, the Dry Fork Hydroelectric Project. This was the first time, nationwide, the new rules were successfully used to disapprove a major proposal. The Dry Fork Project was found to be inconsistent with direction in the Forest Plan.

Further work on the Tie Hack Land Exchange proposal was postponed due to a lack of public access to the proposed non-federal parcel (Husman tract). This proposal was unique, as it would create a Forest inholding, exchanging land currently flooded as part of the Tie Hack Reservoir (City of Buffalo's water supply) for private land on the mountain, southeast of Sheridan, Wyoming.

We have continued with a moratorium on the issuance of any new outfitter-guide permits. This is an issue with various groups, particularly institutional users (colleges and universities). The moratorium was issued due to the lack of a current capacity analysis, and funding to adequately administer current permits.

IMPLEMENTATION MONITORING

MONITORING REQUIREMENT:
Ensure compliance with terms of permits and operating plans.

Inspection and compliance checks are performed to ensure compliance with permit requirements. Due to limitations of personnel and funding, not all permitted uses are inspected at the frequency necessary to ensure that the terms of the permit are being met.

MONITORING REQUIREMENT:
Effect on non-National Forest land management practices on adjacent or intermingled National Forest System lands or on Forest goals.

Activities (grazing, timber harvest, building and road construction, recreation uses) on adjoining and intermingled lands continue to increase. These new activities result in a greater workload for an already impacted staff. Response times are slower, having the potential to cause economic effects for those needing the services (e.g., utility companies, land owners).

Effectiveness Monitoring

The Lands and Special Uses Program complies with the limited direction found in the Forest Plan. Forest Service manuals and handbooks provide principal management policy and procedures. Limited funds and understaffing make it impossible to adequately administer all permits to these established standards.

Validation Monitoring

No recommendations are made for changes in monitoring requirements in the Lands and Special Use Program.

Evaluation and Conclusions

As funding levels continue to decrease and demands for additional services increase, we should consider sharing duties with neighboring administrative units. The Land/Special Uses staffs on the Bighorn and Shoshone National Forests submitted a proposal to do just that, but were unsuccessful due to the limited dollars available to initiate such a program. We must continue to pursue this avenue by other means.

FACILITIES

Program Summary

The Forest Service infrastructure consists of those facilities required for the management of the National Forest. On the Bighorn National Forest there are approximately 1,548 miles of system roads and 87 buildings along with associated structures and utilities which are utilized for resource management.

Funding for maintenance of the infrastructure has never been adequate. As such, priorities have to be set as to what work will be accomplished and what will be deferred. As budgets have declined, the amount of deferred work, or backlog, has increased dramatically. Adding to this is the fact that the majority of our roads and buildings are at or near the end of their design life and in many cases a more substantial investment than routine maintenance will be required.

In 1998 the Forest Service determined that more information was needed to accurately identify what our maintenance needs actually are. An ambitious five-year inventory and reporting program was initiated to identify annual maintenance, deferred maintenance and capital improvement needs for the entire infrastructure of the Forest Service. Through this initiative, every road, trail, building, campground, bridge, etc. will be reviewed for annual maintenance needs, deferred maintenance needs, and capital improvement needs over the next five years.

In 1999, the Bighorn National Forest performed condition surveys on 124 different roads, totaling 367 miles, in an effort to estimate the maintenance backlog on these roads, as well as estimate the current annual maintenance needs and capital improvement needs of these roads. The roads surveyed in 1999 included all of the level 3, 4, and 5 roads on the Bighorn National Forest, which provide use for all passenger vehicles. After relating work items found in the condition surveys performed in the field, with a regional deferred maintenance cost guide, it was found that the Bighorn National Forest currently has an annual maintenance cost of $1,768,207 for all of its level 3, 4, and 5 roads. It was also discovered that the forest currently has a $2,893,407 cost associated with maintenance on these roads that has been deferred over the years, of which, slightly less than half of the cost is associated with critical work items. There was also $202,950 worth of capital improvement needs on these roads. Annual funding for road maintenance on the Bighorn National Forest is currently around $250,000 per year.

In 1999, routine maintenance was performed on approximately 300 miles of road by force account crews, contracts and by permit holders according to the permit requirements. Approximately 0.3 miles of road were constructed and 1.7 miles reconstructed for the Caribou timber sale, and through the construction of the Crystal Creek Rest Area, located on the Medicine Wheel Ranger District. Approximately 5.0 miles of road were decomissioned in 1999.

One bridge on Hunter Road was reconstructed in 1999 using force account crews. Routine maintenance and emergency

repairs were performed on various buildings across the forest. A water system for Burgess Dump Station was constructed and a contract for the construction of a new 20 unit campground as part of the Tiehack Reservoir mitigation was nearly completed. Additional water system enhancements were made via force account and contracts to the Shell Ranger Station and Shell Campground. Technical support was also provided in the areas of special uses, Interdisciplinary teams, accessibility, safety, resource issues as required.

Beginning in 1999 a three year rotation of the road maintenance crew was initiated to improve efficiency. Road maintenance operations other than emergency repairs and routine grading will be concentrated on one unit for the entire year rather than trying to cover the entire forest in a single season. This proved to be an effective means for performing force account work, and will continue to be the means for doing this kind of work. Some of the first-year benefits of performing force account work in this manner was to allow equipment to work longer in certain areas and do a more thorough job. This was evident along the old US 16 Highway where several areas were repaired and the crew was able to monitor these areas and go back and do more work if necessary.

IMPLEMENTATION MONITORING

Construction, reconstruction and maintenance projects are monitored to ensure compliance with applicable laws, regulations, plans and specifications. Coordination with specialists during project planning is accomplished to ensure health, safety, and resource protection measures are incorporated into the projects as required.

MONITORING REQUIREMENT:
Arterial, collector and local road construction and reconstruction.

Road construction and reconstruction standards and guidelines are met by utilizing design criteria developed through an interdisciplinary process and approved by the line officer.

Local road construction consisted of the Caribou timber sale with 0.2 miles of construction and 0.1 mile of construction from the Crystal Creek Rest Area. 1.7 miles of reconstruction were done in conjuction with the Caribou Timber Sale in 1999.

Effectiveness Monitoring

During project implementation, monitoring is achieved through onsite inspections by qualified personnel. Deviations from the planned design are accomplished as necessary to account for a change in conditions or a plan oversight. Input from other specialists is sought as conditions warrant. Final acceptance of contracted projects by the appropriate authority is required.

Validation Monitoring

Construction projects are monitored by personnel during the performance of their routine duties. Changes in future design or modification of maintenance activities are incorporated as necessary to meet management objectives.

Evaluation and Conclusions

Emphasis should be placed on maintaining the portions of existing infrastructure needed for long term forest management.

The roads and buildings that are no longer needed or if there is inadequate funding to maintain them should be identified and disposed of.

Maintenance responsibilities should be shifted to permittees and other users where appropriate.

A Capital Improvement Program should be developed to address the problems of worn out roads and obsolete buildings.

Infrastructure management tools such as databases, road, Geographic Information Systems, Maintenance Management Systems etc. should be incorporated into a unified system and kept current to aid in the ongoing evaluation and management of the Forest Service infrastructure.

RECOMMENDATIONS

A. RECOMMENDATIONS

This list is not all-inclusive, but it addresses key issues from previous years monitoring reports.

SOILS AND WATERSHED

1. Ensure that all aspects of project decisions are identified and funded through the annual budget process. This should include monitoring activities for the soil and water resources. Periodic project reviews should be conducted to ensure NEPA decisions are being implemented in whole.

2. Continue to design Best Management Practices during project design and then assure they are properly implemented and maintained.

3. Emphasize soil and water protection measures during project design and implementation. Ensure that monitoring of projection measures is conducted on a regular basis.

4. Increase emphasis on monitoring of special use permits related to water conveyance systems, septic systems, and in stream flows.

5. Conduct landscape scale analyses in order to assess the existing conditions within large watersheds on the forest.

TIMBER

1. The Forest must emphasize the process of assuring adequate regeneration on regeneration treatments, including aspen regeneration and non-traditional treatments. Suitability for timber production of forested lands should be reviewed in all NEPA documents where treatment of woody vegetation is proposed.

2. Update silviculture standards and guidelines to those listed in the Regional Guide for regeneration, size of created openings, size of uncut areas between created openings, when a created opening will no longer be considered an opening, guidelines that provide direction for the use of landscape level management and guidance for applying silviculture systems to the landscape.

3. Emphasize the importance of requiring silvicultural prescriptions for all vegetative manipulation.

4. Include in the program budget adequate funding for TSI thinning and release, and reforestation both from sale area receipts and appropriated funds.

5. Maintain and validate the ``needs'' reporting in RMRIS for reforestation, release, and thinning. This can be a valuable tool to monitor the regeneration activities on the Forest, but it must be maintained to be effective.

6. Review the projected mortality volume estimates from the 1985 Forest Plan. Current output is 201 percent of projected amount. A determination should be made to see if by exceeding this output we are doing so at the detriment of other resource objectives, or if the projections were inaccurate.

7. Require all quantifiable outputs be reported through the Forest database. This would ensure tracking of our accomplishments for those who will follow us, and accountability of their completion.

8. Standards and Guidelines need to be reviewed and Forest wide interpretation documented, so they can be applied consistently and in consort with objectives, and outputs adjusted accordingly.

INSECTS AND DISEASE

1. It is recommended that the Forest, through the service center in Rapid City, schedule a Forest flight for pest activity every third year (the next flight should be scheduled for 2000). Further it is recommended that the monitoring requirement currently in the Forest Plan be changed to reflect surveys every 3 years, rather than the 800,000 acres each year.

2. If infection levels of blister rust become unacceptable to forest managers then perhaps suppression efforts could be used to reduce the disease incidence in these areas. Thinning limber pine stands to reduce susceptibility to mountain pine beetle (*Dendroctonus ponderosae*) or hazard tree removal in recreational areas may assist in reducing white pine blister rust infection at these sites. This may also help mitigate some of the harsh conditions of limber pine sites and promote improved tree growth and resistance or tolerance of white pine blister rust disease. In addition, the Forest should begin to collect seed from phenotypic resistant Limber Pine for storage in the seed bank and later restocking of affected sites.

3. It is further recommended that the Forest continue to work with the Rapid City Forest Health Management center to assist in monitoring to determine the extent of known populations of insects and diseases of the Forest.

RECREATION AND SCENERY MANAGEMENT

Only one addition is made to previous recommendations contained in earlier monitoring reports. The Forest should take an aggressive role in developing programs where the user shares in the costs of operations. These programs must be accepted by the public to be successful and will require a considerable time commitment to reach consensus. For reader clarity, earlier recommendations are summarized as follows:

1. Ensure that mitigation measures are carried out during project implementation.

2. Adjust and clarify both capacity figures and ROS guidelines in the Forest Plan.

3. Initiate an intensive education and law enforcement program of off-road vehicle use and dispersed camping. Consider the elimination of off-road vehicle areas (“C “areas on our Forest Maps).

4. Develop strategies for collecting reliable recreation use statistics and in defining recreation resource assets.

5. Secure more staff time and outside Forest/Agency involvement in monitoring.

6. Recognize that personal perceptions, needs and values are a part of ecosystem management.

7. Apply land management prescriptions to larger blocks of land in future planning.

8. Ensure adequate funding for trail maintenance and other Forest recreation programs.

9. Place more emphasis on development of partnerships and the use of volunteers to accomplish objectives.

HERITAGE RESOURCES

Recommendations in this section remain the same as noted since the 1989 Monitoring report with the exception of number five (5), which was added in 1992, and number six (6) that was added this year. It should be noted that these recommendations reflect the antiquated nature of the Forest Plan versus what is actually occurring on the ground, as displayed in the above sections in relationship to Programmatic Agreements and Forest Service shift in direction.

1. The Forest Plan needs to be amended to address changes necessary in the management of the Heritage Resource. More specific statements in "General Direction" and "Standards and Guidelines" sections of the Plan relating to existing laws and procedures need to be included. The Forest Plan should reflect a 1988 Amendment to the Archaeological Resource Protection Act, Section 14(b), that requires the preparation of a schedule for surveying lands that are likely to contain the most scientifically valuable archaeological resources, etc.

2. The Forest Plan needs to ensure that aerial spraying to control pest and noxious weeds not be conducted without protective measures in areas containing petroglyphs and pictographs, or in uninventoried areas containing rock outcrops, cliff faces, or rock overhangs. Recent advances in analytical techniques allow for the dating of petroglyphs and pictographs through sensitive chemical ratios.

3. The Forest, through planning and budgeting, needs to develop a Heritage Resource Program that goes beyond meeting compliance standards. Protection of our Heritage Resources for future study and enjoyment by the public is necessary.

4. The Forest needs to incorporate paleontological resource management.

5. The Forest should enter into an agreement with the Wyoming State Historic Preservation Office that deals with the acceptance of impacts to all but the best examples of resource types (e.g. the best tie-hack cabins; the best teepee ring sites). The end result of the agreement would reduce cost.

6. With the implementation of the new regulation, 36 CFR 800, the Forest needs to amend the Forest Plan or enter in agreements with Indian tribes, defining how the Forest will consult with tribes.

LANDS AND SPECIAL USES

As funding levels continue to decrease and demands for additional services increase, we should consider sharing duties with neighboring administrative units. The Lands/Special Uses staffs on the Bighorn and Shoshone National Forests submitted a proposal to the Washington Office to do just that, but were unsuccessful due to the limited dollars available to initiate such a program. We must continue to pursue this avenue by other means.

B. RESEARCH IDENTIFIED

WATERSHED

Below are the recommendations for the soil and water resources. This list is not all inclusive, but addresses key issues brought forward from previous years monitoring reports.

1. We need to ensure that NEPA decisions are funded through the annual budget process. This should also include monitoring activities for the soil and water resources. Periodic project reviews should be conducted to ensure NEPA decisions are being followed.

2. We should continue to build BMPs into project design and assure that they are properly implemented and maintained.

3. We should continue to emphasize soil and water protection measures during project design and implementation. Ensure that monitoring of projection measures is conducted on a regular basis.

4. There should be increased emphasis on monitoring of special use permits related to water conveyance systems, septic systems, and instream flows.

5. There is a need to conduct landscape scale analyses in order to assess the existing conditions within large watersheds on the Forest.

HERITAGE RESOURCES

The Forest contains approximately 340 unevaluated heritage resources properties. Because of legal requirements, these properties must be managed as though they are eligible to the NRHP (National Registry of Historic Places), unless they are evaluated as non-eligible to NRHP. Research is needed to determine property NHRP status. The findings could result in reduced long-term management cost, as several sites would be determine non-eligible, and the Forest would no longer be obligated to manage them. Additionally, the Forest needs to initiate studies to determine impact significance from such activities as erosion, vandalism, and grazing. Due to a recent agreement with the University of Montana, direction from the Forest Service Office in Washington (i.e., perform deferred maintenance assessments), and recent Programmatic Agreements (i.e., Range), the Forest is taking steps to achieve numerous goals in the Heritage Resource program. However, it will be a few more years before personnel can measure the full positive extent of these actions.

LIST OF CONTRIBUTORS

The following are members of the Team that participated in the monitoring and preparation of this report:

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